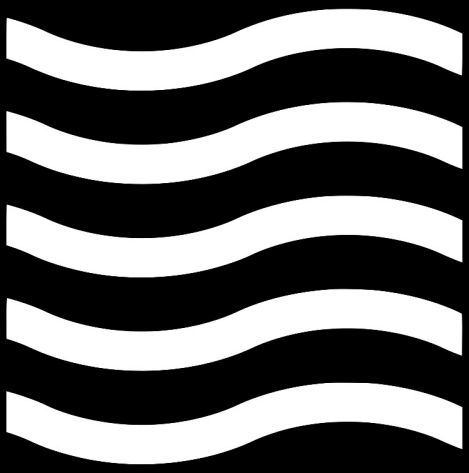
MILFORD PLANNING

Applicant	**Gilmour Space Technologies**
Reference	**M2002.2**
Date	**April 2024**

Change Application (Minor)

Proposed Development	**Change Application (Minor) to SDA Approval APC2022/007 for Material Change of Use - High Impact Industry (Launch Facility)**
Property Details	**Lots 8, 9 and 10 on SP295408**



DOCUMENT CONTROL

Applicant	Gilmour Space Technologies
Proposed Development	Change Application (Minor) to SDA Approval APC2022/007 for Material Change of Use – High Impact Industry (Launch Facility)
Contact	Sarah Jones

Quality Assurance		
Date 10.4.24 **Version** 2 **Issue** Final **Template** DA-STN-1	 Sarah Jones SENIOR TOWN PLANNER	 George Milford DIRECTOR
	Author	**Reviewer**

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TABLE OF CONTENTS

APPENDICES

Appendix 1	Existing Approvals
Appendix 2	SmartMap; and site aerial plan of the subject site
Appendix 3	State Assessment Referral Agency mapping
Appendix 4	State Planning Policy Mapping
Appendix 5	Proposal Plans prepared by i^3 Consulting Pty Ltd
Appendix 6	Environmental Management Plan prepared by Gilmour Space Technologies
Appendix 7	Noise Assessment prepared by Simpson Engineering Group
Appendix 8	Facility Management Plan prepared by Gilmour Space Technologies
Appendix 9	Engine Test Hazard and Risk Document prepared by Gilmour Space Technologies
Appendix 10	Hazardous and Dangerous Goods Management Plan prepared by Gilmour Space Technologies
Appendix 11	Emergency Response Plan prepared by Gilmour Space Technologies
Appendix 12	Security Plan prepared by Gilmour Space Technologies
Appendix 13	Benchmarks Assessment

1.0 INTRODUCTION

1.1 Purpose

The purpose of this application is to seek a change (minor) to SDA Approval APC2022/007 – Material Change of Use - High Impact Industry (Launch Facility) (the approved development) under the provisions of the under the provisions of the *State Development and Public Works Organisation Act 1971* (the Act).

The purpose of this report is to provide information about a proposed change (minor) to existing development approval APC2002/007 and an assessment against the criteria relevant to the change application. The detail in this report is in accordance with the provisions and subordinate planning controls under the Act.

1.2 Structure

This report provides the following information with respect to the assessment of the proposed change:

- overview of the project;
- overview of the approved development;
- description of the BOS Launch Facility proposed change and Minor Change Assessment;
- assessment of environmental, hazard and risk impacts and control and emergency response measures;
- assessment of relevant legislation;
- assessment of the proposed change (minor) against the criteria relevant to the change application and detail of the required amendments to the existing conditions of approval; and
- conclusion and recommendation.

This change application is made in accordance with Section 84F of the Act and contains the mandatory supporting information specified in the applicable form. In accordance with Section 84D of the Act, the change application must be made to the Coordinator-General (CG) as the Assessment Manager. Land owner's consent is not required should the CG determine the proposed change is minor in nature.

This town planning report has been prepared in support of a Minor Change to Development Application APC2022/007 seeking a Development Permit for Material Change of Use – High Impact Industry (Launch Facility) on land described as Lots 8, 9 & 10 on SP295408, and located at Abbot Point Road, Bowen.

Background

Lot 10 on SP295408 does not have direct frontage to Abbot Point Road and as such, the original application lodged nominated access to the BOS launch facility via Lot 12 on SP295408 and Lot 8 on SP295408, with the existing access and intersection with Abbot Point Road being upgraded. Item 11 of the Information Request (combined) associated with AP2021/007 required the BOS launch facility to utilise the existing access servicing Hillery's Quarry, meaning access is via Lots 8 and 9 on SP295408.

The subject land is located within the bounds of the Abbot Point State Development Area (APSDA) and will be assessed under the APSDA Development Scheme 2014. The Lot 10 on SP295408 is identified as being within the Industry Precinct, Environmental Management/Materials Transportation Precinct and Restricted Development Precinct and Lot 8 on SP295408 and Lot 9 on SP295408 is identified as being within the Infrastructure and Corridors Precinct and the Industry Precinct of the APSDA Development Scheme.

In accordance with the APSDA Development Scheme 2014, the level of assessment for a Material Change of Use in the Industry Precinct and the Infrastructure and Corridors Precinct is 'SDA assessable development'. In accordance with Schedule 2 of the APSDA Development Scheme, the Coordinator-General will confirm whether the change proposed is accepted as a minor change to development application APC2022/007.

2.0 APPROVED DEVELOPMENT

2.1 Detail of Approved Development

The following parameters are applicable to the approved development subject to this change application.

Approval Type	SDA Approval (Development Permit)
Development Type	Material Change of Use
Definition or General Description	High Impact Industry
Specific Description	Launch Facility
Assessment Manager	Coordinator General
Change DA Reference	APC2022/007 (AP2021/007)
Original DA Reference	AP201/007
Planning Instrument	*Abbot Point State Development Area Development Scheme*
Category of Assessment	Assessable Development
Referral Agencies	▪ Civil Aviation Safety Authority; ▪ Department of Agriculture and Fisheries; ▪ Department of Environment and Science; ▪ Department of Transport and Main Roads; ▪ Maritime Safety Queensland; ▪ North Queensland Bulk Ports Corporation Pty Ltd; ▪ Office of Industrial Relations | Major Hazards Facilities Unit; ▪ Queensland Fire and Emergency Services; ▪ Resources Safety and Health Queensland | Explosives Directorate; and ▪ Whitsunday Regional Council.
Advice Agencies	▪ Aurizon Property Pty Ltd; ▪ Australian Communications and Media Authority; ▪ Australian Space Agency; ▪ Bowen Rail Company Pty Ltd; ▪ Hillery Group; and ▪ Juru Enterprises Limited.

Change Approval Date	12 December 2022 (refer **Appendix 1**)
Original Approval Date	21 June 2022 (refer **Appendix 1**)
Currency Period Ends	Ten (10) years from the date of obtaining the Commonwealth Minister's approval, in accordance with the *Space (Launches and Returns) Act 2018*, for a launch facility licence to operate a launch facility on the land, the subject of this approval.

2.2 Approvals Background

Launch Facility

Bowen Orbital Spaceport Launch Facility was approved (subject to conditions) by the Office of the Coordinator General (OCG) on 21 June 2022, on land described as on land described as Lots 8, 9 and 10 on SP295408 and located at Abbot Point Road, Bowen. This approval allows Gilmour Space to launch small class orbital launch vehicles, containing satellite payloads, into space and undertake engine testing during Launch Campaigns.

Operational Work – Whitsunday Regional Council issued an Operational Work Permit – Bulk Earthworks, Access Road and Stormwater on 24 February 2022.

Communication Tower

A 24 m communication tower for telco antennas was approved (subject to conditions) by the OCG as a change (minor) to SDA Approval AP2021/007 on 12 December 2022.

Launch Control Centre

A Launch Control Centre (LCC) was approved (subject to conditions) by the OCG on 4 August 2022 AP2022/013. The LCC includes a number work stations (desks) with computers and a separate desk for the Launch Safety Officer. The LCC will be used by Gilmour Space personnel leading up to a launch and during launches. The LCC will be used to interact with the launch vehicle and its loading equipment for remote access and operation of the pre-launch activities, monitoring during launch and operation of any emergency management process if required. The LCC is located on an area of land within the existing NQBP facility at Abbot Point, to the northwest of the launch facility.

3.0 SITE AND SURROUNDING AREA

3.1 Site Details

Specific details pertaining to the subject site are incorporated in the following **Table 3.1**.

Street Address	Abbot Point Road, Bowen.
Real Property Description	Lot 8 on SP295408. Lot 9 on SP295408. Lot 10 on SP295408.
Property Owner	Economic Development Queensland
Site Area	Lot 8 on SP295408 – 4.565 ha. Lot 9 on SP295408 – 64.57 ha. Lot 10 on SP295408 – 94 ha (refer **Appendix 2**).
Street Frontage	Lot 8 on SP295408 – Abbot Point Road. Lot 9 on SP295408 – Abbot Point Road. Lot 10 on SP295408– No street frontage (refer **Appendix 2**).
Current Use	Vacant.
APSDA Land Use Precinct	Industry Precinct and Infrastructure and Corridors Precinct.
Local Heritage Register	The site is not listed on the Local Heritage Register.
Contaminated Land	The land is not known to be included on the Queensland Government's Environmental Management Register or Contaminated Land Register.
Easement	Lot 9 on SP295408 is burdened by any easement, which provides access to the quarry on Lot 44 on HR1599.
Topography	The site has generally even topography.
Existing Infrastructure	The property is not connected to Council's reticulated water services.
SARA Mapping	The lands are identified as being mapped within the State Assessment and Referral Agency (SARA) mapping overlays (refer **Appendix 3**): ▪ Coastal management district; ▪ Coastal area - erosion prone area and medium and high storm tide inundation area; ▪ Queensland waterways for waterway barrier works; ▪ Wetland protection area trigger area and wetland protection area and ▪ Regulated vegetation management map (category A and B extract).
State Planning Policies	The site is identified as being located within the following State Planning Policy mapping layers (refer **Appendix 4**): ▪ Agriculture – Important agricultural area and agricultural land classification – class A and B; ▪ Development and construction – State development area; ▪ Biodiversity – MSES – Wildlife Habitat (endangered or vulnerable); ▪ Biodiversity – MSES – Wildlife Habitat (special least concern animal);

	▪ Biodiversity – MSES – Regulated Vegetation (category R); ▪ Biodiversity – MSES – Regulated vegetation (intersecting a watercourse); ▪ Biodiversity – MSES – High ecological significance wetlands; ▪ Coastal Environment – Coastal management district; ▪ Natural hazards risk and resilience – Flood hazard area – Level 1; ▪ Natural hazards risk and resilience – Local Government Flood Mapping Area; ▪ Natural hazards risk and resilience – Bushfire prone area; ▪ Natural hazards risk and resilience – Erosion prone area; ▪ Natural hazards risk and resilience – Medium storm tide inundation area; ▪ Natural hazards risk and resilience – High storm tide inundation area; and ▪ Strategic ports – Strategic ports.
Referral Agencies	The Coordinator-General will advise of any applicable referral agencies.
Planning Instrument	*APSDA Development Scheme 2014.*

3.2 Site and Surrounding Area

The subject site consists of an irregular shaped allotment with an area of 94 ha. The subject site does not have direct frontage to Abbot Point Road, as a consequence, the current access to the site from Abbot Point Road, traverses Lots 8 and 9 on SP295408. The subject site is currently vacant of structures and used for grazing and pastoral activities.

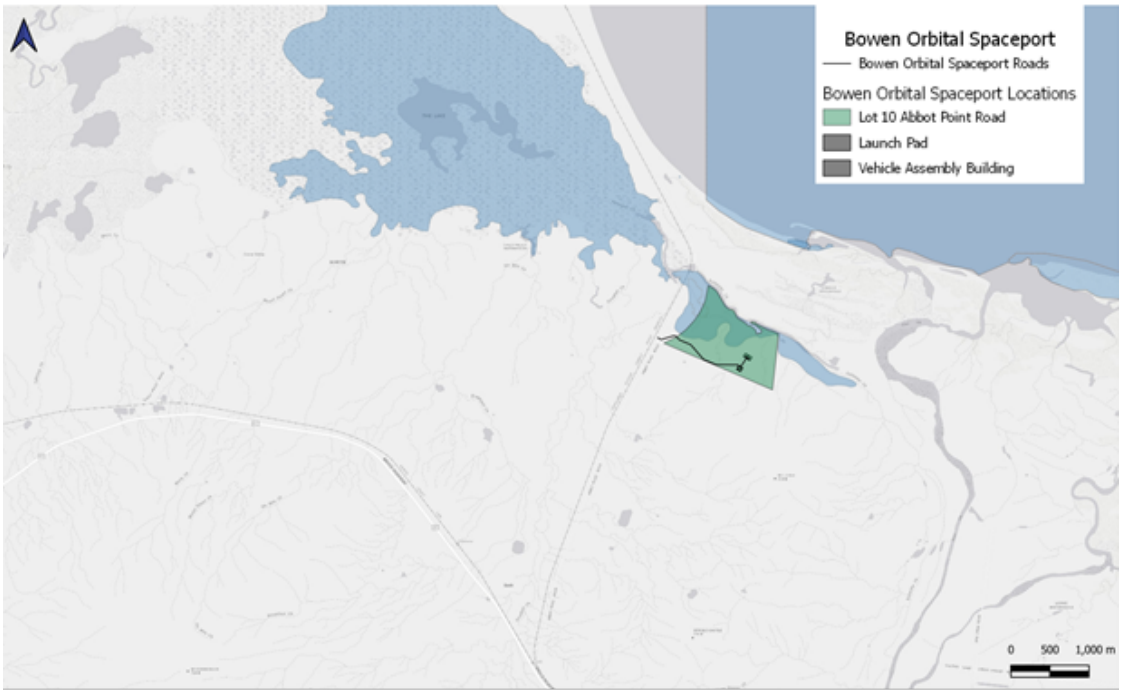


Figure 1: Location of the Proposed Site (Source FYFE Engineering Report from AP2021/007)

The subject site is accessed via a single road, Abbot Point Road. Abbot Point Road is a private road which is owned by the North Queensland Bulk Ports (NQBP) Corporation. The section of Abbot Point Road up to the gated NQBP security office is publicly accessible. Access to the section of Abbot Point Road north of the NQBP gates and security office is managed and controlled by NQBP. NQBP also has jurisdiction to manage access to the precinct via sea in line with their port operations.

The subject site is not connected to any existing reticulated water or sewerage networks. The subject site is gently graded from the high southern cadastral boundary to the northern cadastral boundary, where the shallowest portion of the lot being along the northern boundary, which is the part of the lot that is located within the Caley Valley Wetlands directly adjacent to Saltwater Creek. The Caley Valley Wetlands is listed on the Directory of Important Wetlands in Australia (DIWA).

The subject site is mapped as containing a wetland and associated wetland protection area and the APSDA scheme identifies a water course running along the northern boundary of the Lot 10 on SP295408. The subject site is mapped as containing a number of wetlands, watercourses and drainage features. Vegetation across the site is mapped remnant Category B vegetation containing least concern ecosystems and non-remnant vegetation. The title searches for Lots 8, 9 and 10 on SP295408 nominates that there is a current vegetation notice associated with the subject site.

Further to the north is Abbot Point Bay, to the northwest NQ Bulk Port and Caley Valley Wetlands, immediately to the south is an existing quarry and to the west rail infrastructure and grazing and pastoral activities. Lot 10 on SP295408 is identified as being within the Industry Precinct, Environmental Management/Materials Transportation Precinct and Restricted Development Precinct and Lot 8 on SP295408 and Lot 9 on SP295408 is identified as being within the Infrastructure and Corridors Precinct and the Industry Precinct.

The subject site is approximately 25 km north of Bowen by road and 8 km south from the Abbot Point Coal Terminal and the Port of Abbot Point. The Port of Abbot Point is one of only 4 priority ports recognised as key to the economic growth of the local region and Queensland. The port is strategically located away from sensitive urban development and it is close to naturally deep water, major road and rail transport corridors and also Bowen and Galilee Basin.

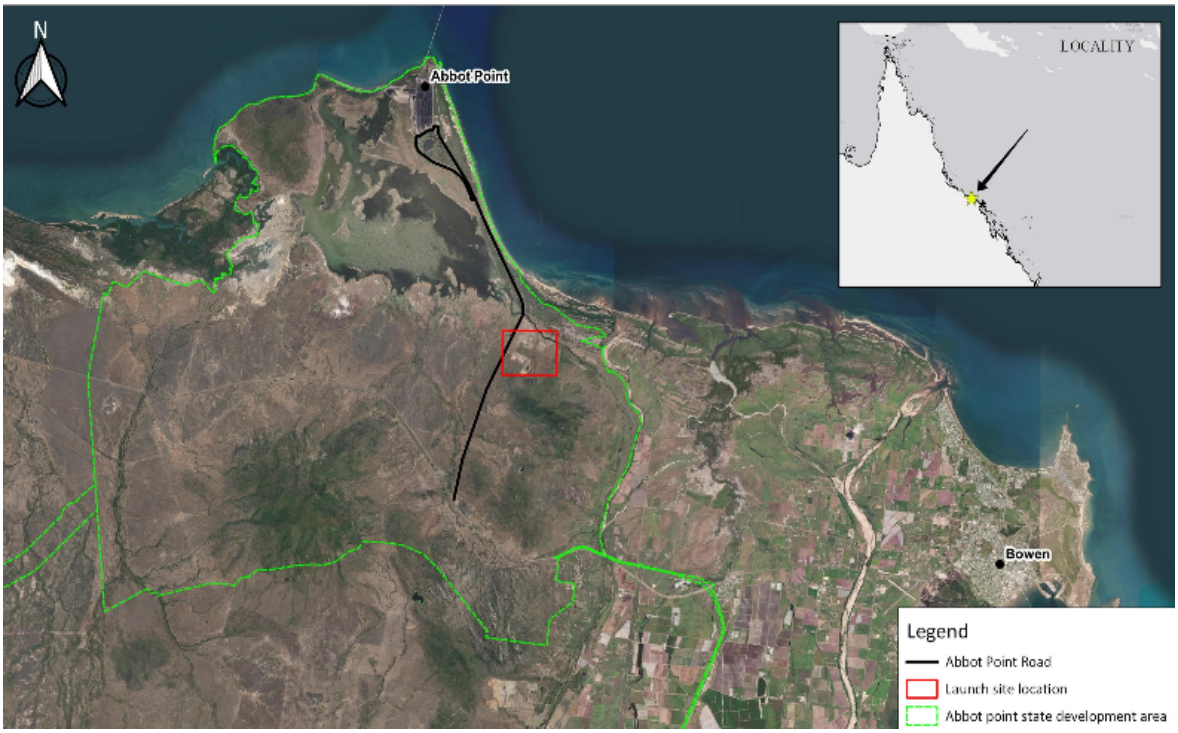


Figure 2: Site Location Aerial (Source: SMEC – Environmental Assessment Report from AP2021/007)

3.3 Site Selection

The BOS site was selected as a prime location given:

- its location within the Abbot Point State Development Area;
- its location in close proximity to the coast;
- its proximity from Abbot Point Road provides privacy and a secluded setting; and
- distance from sensitive receptors in the context of the community of Bowen.

4.0 GILMOUR SPACE & BOWEN ORBITAL SPACEPORT PROJECT

4.1 Gilmour Space Technologies Overview

Gilmour Space Technologies (Gilmour Space) is an Australian company based in Helensvale on the Gold Coast that is committed to providing sovereign orbital launch capabilities for Australia. The Australian space industry represents a small but significant sector of the Australian economy with significant growth potential. The establishment of the BOS operational orbital launch facility will enable greater market participation for Australian space companies in both domestic and international markets. Gilmour Space employed over 80 employees at the time the original application (AP2021/007) was lodged, with this number increasing to 200 at the present time and is a leader in the Australian space industry.

Gilmour Space is an innovator that has been investing in and developing technologies to drive the cost of space access down and the reliability of access to orbit up. Gilmour Space launched their first rocket in 2016 using a novel propulsion system and their hybrid rocket propulsion technology is a key enabler for the Eris orbital launch vehicle, providing safer, cheaper launch and growing the Australian space industry.

Gilmour Space is a venture funded rocket company, developing new capabilities for launching small satellites to space. Gilmour Space provides innovative hybrid propulsion technologies that will offer lower cost access to space.

Gilmour Space is committed to providing Australia with sovereign launch capability. Though the domestic space industry represents a small sector of the Australian economy, it has significant growth potential.

Establishing an operational orbital launch facility with a wide range of accessible launch azimuths will enable greater market participation for Australian space companies in both domestic and international markets.

Gilmour Space has already signed and secured contracts with a range of Australian and International customers to provide launch services for payloads to low Earth orbit on their Eris vehicle.

4.2 Bowen Orbital Spaceport Project Overview

Gilmour Space, in consultation with the Queensland State Government identified Bowen as a prime location for the establishment of an orbital spaceport, named the Bowen Orbital Spaceport (BOS). The Queensland Government Space Industry Strategy (published in February

2020) identified the importance of growing space capabilities. The Queensland Government announced the site at Abbot Point as suitable for the BOS launch facility in May 2021.

The Bowen region, in particular Abbot Point, is very well suited to the space launch industry, due to several factors. Importantly, the relatively remote location of the site provides a high level of public safety, whilst also allowing access to a relatively well-developed level of public infrastructure, and with its proximity to Bowen and surrounding centres, offers a good level of industrial capacity.

A technical and environmental study commissioned by the Queensland Government informed the choice of the site within Abbot Point State Development Area, concluding that the Abbot Point site was considered suitable for small-scale launch vehicles. The geographic location of the site, proximate to the coast for eastward launches increases the inherent level of public safety and the latitude, being quite close to the equator, provides efficient access to a range of orbital inclinations for eastward launches.

4.3 BOS Project Economic and Social Benefits

Australian Space Agency

The Australian Space Agency (ASA) was established on 1 July 2018, in order to coordinate civil space matters across government and support the growth and transformation of Australia's space industry.

Australia's space sector supports virtually every sector of the Australian economy and includes launching satellites and spacecrafts into space, as well as using space to help us communicate, locate, and see the Earth in new ways. The ASA published the Australian Civil Space Strategy 2018 - 2028, which outlines how the Government plans to transform and grow our space industry over 10 years and diversify the economy by increasing the size of its share or the space the economy. The strategy is based around four strategic pillars, refer to Figure 3 overleaf.

Figure 3: ASA's Four Strategic Spaces Pillars (Source: ASA Website)

The BOS Launch Facility is an important project in the context the context of the abovementioned strategy, being the first launch facility in Queensland.

Space Economy Overview

Deloitte Access Economics in February 2019 published a report titled 'Sky is not the limit – Building Queensland's Space Economy'. The purpose of the report was to outline the economic opportunities associated with space for Queensland. On a daily basis, the global space economy provides essential data and information that facilitates the use of a range of services for example internet banking, navigation systems and mobile phones and the various applications. Space also provides valuable information in terms of weather monitoring which informs emergency planning and management.

The global space economy is valued at US$345 billion (in 2016) (source; 'Sky is not the limit – Building Queensland's Space Economy') and is continued to grow as space technology and research activities and ventures are broadening in scope. Historically, the space sector, has been industry led, financed and managed by government, due to the high entry costs and risks associated with the space industry. More recently, the space sector has experienced a shift towards decentralisation of space activities from government into the private sector, which has facilitated a growth in the commercial elements. Therefore, the global space economy today, includes an increasing number of private organisations and investors, working in conjunction with space agencies.

The national position is that Australia participates in the growth of the global space economy. As outlined in Sky is not the limit – Building Queensland's Space Economy, *'the Australian Government's space industry Expert Reference Group set an ambitious and exciting goal for the Australian space community to triple the size of the Australian space economy from the 2015- 16 estimate of $3.94 billion, to $10-$12 billion by 2030. This will create an industry that is roughly one-third the size of Australia's current agricultural output, and will stimulate investment along the supply chain, from research and development through to commercialisation and export'.*

The Queensland space economy has great ambitions in terms of continuing to develop niche globally competitive, high value add goods and services that can be exported to the world. The small size of Queensland's space economy can be described as a strength, with space organisations working together in terms of building the required infrastructure and ensuring the specialised research capabilities are in place to support the space organisations on their mission to growth the space economy.

Queensland's geographic location provides unique opportunities for space systems, launch activities, ground systems and space enabled services, along with its existing economic strengths in the mining and research and development industries.

<u>BOS Project Economic Benefit</u>

The Queensland space industry directly employs around 2,000 full time equivalent jobs (FTEs) and contributes half a billion dollars in value added to Queensland's economy (2018-19). This is equivalent to about 4.4% of Queensland's agriculture industry or 2.4% of Queensland's manufacturing industry (in value added terms).

Over the next two decades, as outlined in the 'Sky is not the limit – Building Queensland's Space Economy', under a 'medium growth scenario' the industry could contribute an additional $1.3 billion to Queensland's economy and employ approximately 5,000 FTEs, which is the equivalent to about one quarter of the value added by today's IT, media and telecommunications industry in Queensland.

The BOS Launch Facility site at Abbot Point Road, is considered a suitable site given its coastal location, proximity to the equator, which benefits from direct and efficient launch pathways for the orbital satellites and lack of sensitive receptors in the context if residential dwellings, schools and the like, within the launch pathways.

Potential Direct Benefits

Gilmour Space are seeking to take advantage of the emerging space opportunities in Queensland and by developing a launch facility to launch orbital satellites into space. The BOS project provided local employment opportunities during the construction and now during the operational

phases for approximately 40 full time equivalent staff (FTE) and greater during a launch campaign. The employment opportunities will have a trickledown effect in terms of local spend and purchases of materials and products, but also accommodation, hospitality and retail use during the construction and operational phase of the BOS project. Noting 70 % of the materials and the like have been sourced regionally from Mackay up to Townsville.

Potential Indirect Benefits

The establishment of the BOS project has the potential to attract complementary space or research and development related uses to the region, especially given the appetite to grow Queensland's opportunities and involvement in the Space Industry and it being an important economic growth sector in terms of Queensland's economy. If these complementary uses transpire on the ground, then the economic benefits from the BOS project for the region and State would be far greater.

The BOS project has established the first orbital rocket launch facility in Queensland, which based on social media interactions is attracting a lot of interest from space enthusiasts locally and globally and will draw space enthusiasts and other visitors to the region. This will provide a positive impact in terms of increased visitation and tourism for the region and additional spending to the benefit of the local economy. As with other international space related infrastructure and events, these are renown for being tourist attractions for enthusiasts, the local community or tourists. Space enthusiasts, the local community and tourists will have the opportunity to observe the launches from a specific designated area, now the BOS Launch Facility has been constructed.

Potential Social Benefits

Currently, satellites orbit round the earth, moon or other planets in order to collect information or for communication. Such satellites enable the continued daily use of internet banking, navigation systems and mobile phones and the various applications. Space also provides valuable information in terms of weather monitoring which informs emergency planning and management. The BOS project will build upon the social benefits that satellites currently provide on an ongoing basis, both from an operational perspective, but also a protection and management perspective, in terms of severe weather events or other potential emergency events.

The BOS project will contribute to sustainable development, broaden educational, learning and career opportunities for the future generations in a new and developing industry. Economic growth and benefits generally lead to wider choices in terms of day to day services industries and other support facilities.

Being the first facility in Queensland, it will support existing and promote additional tourism to the region. Tourism helps generate economic growth, providing employment opportunities,

improvements and increased infrastructure. There are a range of economic and social benefits associated with establishing the first launch facility in Bowen, Queensland.

5.0 BOS LAUNCH FACILITY & DESCRIPTION OF PROPOSED CHANGE

5.1 Overview

This report details a development application seeking a Change (Minor) to SDA Development Approval APC2022/007 for Material Change of Use – High Impact Industry - Launch Facility on land described as Lots 8, 9 & 10 on SP295408 and located at Abbot Point Road, Bowen.

5.2 BOS Launch Facility and Proposed Change

BOS Launch Facility

Gilmour Space have established the BOS Launch Facility, as part of the Bowen Orbital Spaceport project (BOS) over part of Lot 10 on SP295408, which is located at Abbot Point Road, Bowen. The BOS Launch Facility is the first one in Queensland and provides Gilmour Space a facility for launching small class orbital launch vehicles containing satellite payloads into space.

Launch operations will include campaigns, and a complete launch campaign is expected to run somewhere between 60 to 90 days. Gilmour Space plans to launch two rockets per year until 2025, after which, Gilmour Space will aim to increase launch frequencies towards a monthly launch campaign.

In summary the key phases associated with a launch are outlined below:

- **Transport** - Transport, and receipt of launch vehicle stages and rocket ancillaries at the launch facility.
- **Inspection** - Inspection and repairs (where required) of the transported launch vehicle stages.
- **Assembly** - Cleaning, final manufacture, assembly, verification, and testing of the launch vehicle and launch fluids.
- **Launch Operations** - Erection of launch vehicle on launcher, fluids and communications connection, and testing of launch fluid systems.
- **Launch** - Range safety, fluids filling and launch.
- **Recovery** – Inspection and remediation of the facility and site in readiness for next launch mission.
- **General Operations** - General activities associated with the maintenance and operation of the facility and site.

Access to the BOS Launch Facility is from Abbot Point Road via Lots 8 and 9 on SP295408 and an internal access and a 1.15 km access track, which leads to the electronic security gates of the BOS Launch Facility, refer to **Figure 4** below.

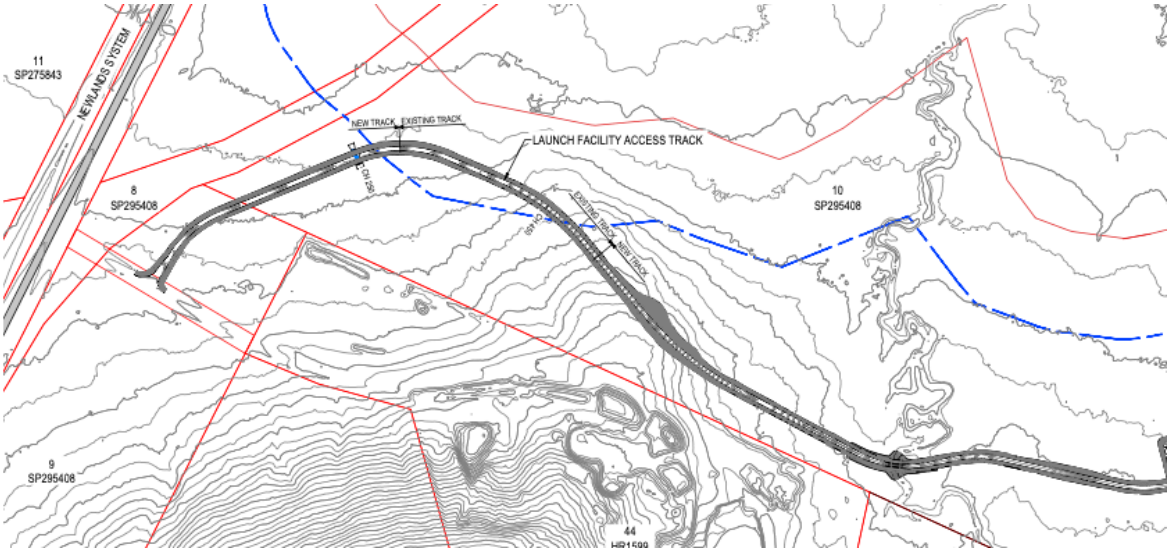


Figure 4: Existing Internal Access and Access Track (Source FYFE Engineering Report from AP2021/007)

The BOS Launch Facility has three distinct areas including:

- a Vehicle Assembly Building (VAB);
- hardstand area used as a temporary material staging location during permanent operations; and
- a launch pad area.

<u>Proposed Change - Test Activity</u>

The proposed change involves the establishment of two small hardstand test pads, to the north and north east of the BOS Launch Facility and associated infrastructure, the configuration of which will be tailored to the testing being completed. The proposed change is required to enable Gilmour Space to carry out rocket engine testing on the engines of the three stages of the launch vehicle The proposed engine testing activities will coexist and complement the existing activities/operations associated with the BOS Launch Facility.

BOS test operations will be variable in length and will be designed to test or verify components of the vehicle propulsion system at system and subsystem level. Sub system tests will include verification of components like oxidiser pumps or liquid igniters where system level tests would include flight-like rocket engines or verniers.

Testing rocket engines is critical to launch operations in terms of verification of production or flight articles including liquid bi-propellant rocket engines (ERIS 3rd stage), hybrid rocket engines

(ERIS 1st and 2nd stages) and mono-propellant engines (ERIS vernier engines) as well as product development and characterisation. As such, the proposed engine testing is considered to be a related and ancillary activity to the primary launch activities associated with the BOS Launch Facility.

To date, the test activity for the abovementioned launch vehicle engines have been undertaken at an approved Motor Testing Facility in Helidon. However, due to unresolvable circumstances, which are beyond the Applicant's control, this facility is no longer available to Gilmour Space to undertake the test activity, hence the need to secure an alternative location for engine testing, verification and development. The approved BOS Launch Facility is the most logical and practical alternative location.

Access to the proposed test pads will be via the existing fire trail that has been established around the BOS Launch Facility on Lot 10 on SP295408. The fire trail starts immediately to the north of the existing security gates and entrance to the BOS Launch Facility, refer to **Figure 5** below.

Figure 5: Existing Fire Trail Track & Test Pads (Source: Queensland Globe)

Minor Change Assessment Table

The following table provides an assessment of the proposed test activity the context of the definition of 'minor change', as specified in Schedule 2 of the *Planning Act 2016* (the Act).

Minor Change Criteria	Comment
would not result in substantially different development	The proposed test activity will not result in a substantially different development. The approved operations associated with the BOS Launch Facility include testing the launch vehicle and its various components, including engines, during launch campaigns. It is not considered that the proposed change to include more generalised rocket engine testing and verification activities will result in a substantially different development in the context of the BOS Launch Facility approval and associated operations.
the inclusion of prohibited development in the application	The proposed test activity does not include prohibited development.
referral to a Referral Agency, other than the Chief Executive, if there were no Referral Agencies for the original development application;	The original application was referred to a number of advice agencies for comment.
referral to extra Referral Agencies, other than the Chief Executive;	The proposed test activity will not result in extra referral agencies.
a Referral Agency to assess the application, or have regard to, any other matter other than matters that were assessed or regarded for the original application	The proposed test activity will not cause assessment against any other matter than matters that were assessed ore regarded for in the original application.
public notification if public notification was not required for the original development application	The original application was subject to public consultation, during which the OCG received no submissions in relation to the BOS launch facility. Given the nature of the proposed day to day rocket engine testing in the context of the approved BOS launch facility, it is not considered that the change application need to go through a further public consultation period.

5.3 Construction Programme

BOS Launch Facility

The construction of the BOS launch facility is now complete, with it accommodating the southern portion of Lot 10 on SP295408.

Test Pads

The two hardstand test pads have already been established to the north and north east of the existing BOS Launch Facility. In terms of the earthworks associated with constructing the test pad these were minimal given existing ground levels, the minimum area of the concrete pads and the fact that the pads will only contain temporary infrastructure and temporary containers. The test pads have been designed in accordance with the required standards to suit the proposed testing activities, refer to **Appendix 5,** for the detailed design drawings of test pads.

Minor Change Assessment Table

The following table provides an assessment of the test activity construction programme in the context of the definition of 'minor change', as specified in Schedule 2 of the Act.

Minor Change Criteria	Comment
would not result in substantially different development	The construction of the hardstand test pads associated with the proposed test activity, will not result in a substantially different development to the BOS Launch Facility Approval, given the minor works associated with the test hardstand pads.
the inclusion of prohibited development in the application	The construction of the hardstand test pads associated with the proposed test activity, will not result in the inclusion of prohibited development.
referral to a Referral Agency, other than the Chief Executive, if there were no Referral Agencies for the original development application;	The original application was referred to a number of advice agencies for comment.
referral to extra Referral Agencies, other than the Chief Executive;	The construction of the hardstand test pads associated with the proposed test activity, will not trigger to extra referral agencies.
a Referral Agency to assess the application, or have regard to, any other matter other than matters that were assessed or regarded for the original application	The construction of the hardstand test pads associated with the proposed test activity, will not cause assessment against any other matter than matters that were assessed ore regarded for in the original application.
public notification if public notification was not required for the original development application	The original application was subject to public consultation, during which the OCG received no submissions in relation to the BOS launch facility. Given the nature of the earthworks associated with the construction of the hardstand test pads.

5.4 Operational Activities

BOS Launch Facility and Launch Campaign Activities

The vehicle assembly building (VAB) is the primary location of day-to-day operations for the BOS Launch Facility. The VAB is an industrial building that is used to assemble all three stages of the Eris launch vehicle, along with the assembly of the launch vehicle, other activities associated with the VAB include the delivery, receipt, upgrade or repair, calibration and verification of parts and software, integration and testing of launch vehicle parts, stages, and payloads in a clean and secure environment.

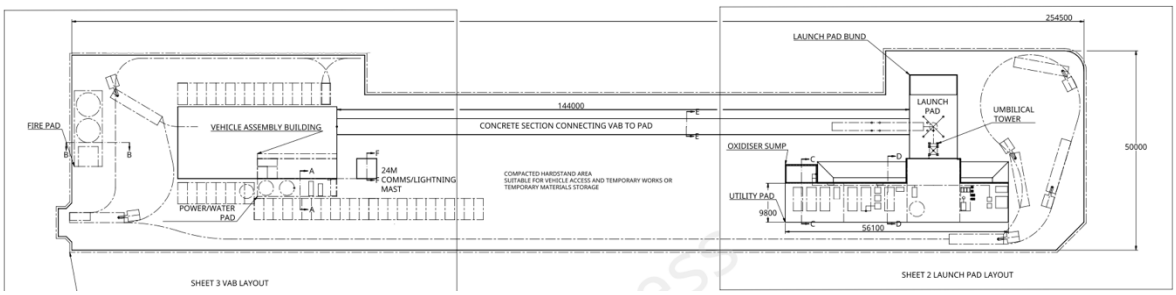


Figure 6: BOS Facility Layout (Source: Approved Plans associated with APC2022/007)

The proposed change does not alter any of the components of the constructed BOS Launch Facility.

The proposed change does not alter the activities associated with the Launch Campaign. The Launch Campaign Team will comprise of a 20 person team that will be supported by large teams of propulsion, mechanical, avionics and software engineers from the Helensvale.

HQ (mission control) and the Launch Control Centre (LCC) are located on lands within the Port of Abbot Point. In the days leading up to a launch activity there may be brief periods where as many as 40 to 60 staff are temporarily required on site at both the launch facility and the launch control centre. A high-level summary of the typical activities involved in a launch campaign are shown in **Table 5.4**.

Table 5.4: Launch Campaign Overview (Source: Transport and Access Prepared by Gilmour Space)

Timing	Typical Activities
T-90 days Launch Readiness Activities	Launch vehicle components begin arriving at the VAB in three 40 ft containers from the Gilmour Space's Mission Control at Helensvale on Queensland's Gold Coast. Integration and test activity.
T-45 days Client Payload and Launch Approvals	Client payload is received at the VAB. Assembly and Integration of the payload begins. Permits for launch activity must be approved by the Australian Space Agency (ASA) on this date.
T-10 days Launch Pad Configuration	Launch pad preparation and testing. Launch support and recovery services established at LCC.
T-5 days Launch Fluids Connection & Testing	Launch fluids are delivered. Target Launch Date and time is confirmed.
T-24 hours Weather Monitoring & Final Checks	Launch sequence communication with affected parties begins. Anemometry and weather monitoring begins to confirm forecast weather conditions for launch. The rocket is fully integrated into the launch erector and fluid systems are connected to the rocket.
T-4 hours Exclusion zone implementation & alerts	Public safety barriers and controls, Airspace notifications, and Marine exclusion zones are implemented.

T-2 hours Launch Sequence	Launch vehicle communications are confirmed, rocket is pressurised, final manual checkouts are performed Gilmour Space begins monitoring exclusion zones. Rocket filling and launch procedures to begin.
T-30 Minutes Launch Countdown	Downrange exclusion zone and all GO/ NO GO criteria confirmed clear for launch Flight computers confirm final flight readiness checks T-2 Minutes Rocket booster stage ignition begins.
T-0	Launch vehicle hold downs released - Launch

Test activity at the BOS Launch Facility includes the qualification and characterisation of production and developmental components of propulsion systems at both the system and sub system level. Test activity involves several phases:

- test set up (wherein test stands and test articles are prepared);
- test activity (wherein the test article operates, i.e. pump run or engine ignition); and
- test tear down (wherein data is retrieved, the test article is removed and the test stand is decommissioned or placed into storage mode).

Test frequency and test length will vary according to need. Short duration, qualification activity will generally be associated with launch campaigns and will last days utilising the same engineering and technical staff as the launch campaign.

Proposed Test Activity

The proposed test activity includes two small hardstand test pads, test pad 1 (Hybrid Rocket Engine (HRE) located to the north east of the BOS launch facility and test pad 2 (Liquid Rocket Engine (LRE) to the north, refer to **Appendix 5**. The proposed test pads will allow the isolated conduct of engine and propulsive component test and verification activities. Each test pad is contained within a designated fenced area, incorporating a minimal hardstand, vehicle access ramp and thrust structure. Each test pad can be configured to support a variety of test options and infrastructures. The HRE test pad is primarily intended for hybrid rocket motor tests, with temporary storage provided for hydrogen peroxide, while the LRE test pad is primarily intended for a liquid rocket engine tests, with temporary storage facilities for kerosene and liquid oxygen.

Table 5.4.1 below outlines the engines that will be tested and respective test pad.

Table 5.4.1 Engine Type and Test Pad

Engine Type	Test Pad
Catpac HRM	1
Small HRM	1
Big HRM	1
Small RCS	1
Big RCS	1

Small LRE	2
Big LRM	2

The proposed engine testing infrastructure that will be installed on the test hardstand pads will be configured to suit the testing options being completed. Testing is conducted on customised test rigs that include thrust structures; power supplies, fluids supply networks, control, instrumentation and data acquisition equipment, kinetic capture and armouring structures, and emergency stop apparatus. The firing/ testing direction for the HRE test pad will be 25 degrees i.e. to the north/ northeast and the LRE test pad will be 17 degrees i.e. north/ north east.

Th proposed rocket engine testing associated with the test pads will be generally in accordance with the indicative Engine Test Plan, which is outlined in **Table 5.4.2** below and overleaf

Table 5.4.2 Indicative Engine Test Plan

Test Day Options	Engine Test	Durations
1	1 Big HRM	120 seconds
2a	3 Catpack HRM 1 Small LRE	30 seconds each 240 seconds
2b	3 Catpack HRM 2 Big RCS	30 seconds each 60 seconds each
3a	2 Small HRM 1 Small LRE	120 seconds each 240 seconds
3b	2 Small HRM 2 Big RCS	120 seconds each 60 seconds each
4a	4 Big RCS 1 Small LRE	40 seconds each 240 seconds each
4b	4 Big RCS 2 Big LRE	60 seconds each 5 seconds each

It is evident for **Table 5.4.2** that the duration of the proposed test activity will be conducted over very short durations of 1-3 seconds or full burn durations of up to 2-3 minutes. The test activity will form part of the proposed test campaigns that may last from days to weeks. The proposed test campaign team will be small (3-5 person teams) and prepare the test articles and supporting test infrastructure, conduct the test, gather the test data and demobilise the test articles and supporting infrastructure from the pad.

When the test pads and surrounds are ready for testing to be carried out, the test team will relocate to a small donga/ container style building located in between Test Pad 1 and Test Pad 2

to complete the testing. Similar to, but much smaller than the LCC, this building will contain desks and computers to monitor test activity.

The proposed test activity associated with the proposed test campaigns for Test Pads 1 and 2 will not be carried out when test activity are being completed during a Launch Campaign. In summary, the proposed change involves the following additional infrastructure for the BOS Launch Facility:

- HRE Test Pad:
  - regular shaped gravel hardstand 40 m x 40 m;
  - hardstand pads (12 m x 15 m) and (13 m x 15 m) to the north east of the existing BOS Launch Facility;
  - associated testing infrastructure, including test stands, container wall configuration, link block walls (2.4 m to 3. 6 m high), and sand bag wall (3 m high);
  - primarily hybrid rocket motor testing;
  - temporary storage facilities (container and tanks) for hydrogen peroxide;
  - rural fencing and gated access to the HRE test pad;
  - temporary and moveable storage container(s)/ workshop(s);
  - generator;
  - water storage tanks/ containers; and
  - gas storage tanks/ containers.

- LRE Test Pad:
  - regular shaped gravel area 20 m x 23 m;
  - hardstand pad (8 m x 14 m) to the north of the existing BOS Launch Facility;
  - associated testing infrastructure, including test stand and link block walls (1.8 m);
  - primarily liquid rocket engine testing;
  - temporary storage facilities for kerosene and liquid oxygen;
  - rural fencing and gated access to LRE test pad;
  - temporary and moveable storage container(s)/ workshop(s);
  - two generators;
  - LOX run tank and values; and
  - RP run tank and values.

Minor Change Assessment Table

The following table provides an assessment of the proposed test activity operations in the context of the definition of 'minor change', as specified in Schedule 2 of the Act.

Minor Change Criteria	Comment
would not result in substantially different development	The test activity operations and associated test pads will not result in a substantially different development, given the minor works associated with the test hardstand pads and the approved test activities associated with the BOS Launch Facility.
the inclusion of prohibited development in the application	The test activity operations and associated test pads will not result in a substantially different development will not result in the inclusion of prohibited development.
referral to a Referral Agency, other than the Chief Executive, if there were no Referral Agencies for the original development application;	The original application was referred to a number of advice agencies for comment.
referral to extra Referral Agencies, other than the Chief Executive;	The test activity operations and associated test pads will not result in a substantially different development will not trigger referral to extra referral agencies.
a Referral Agency to assess the application, or have regard to, any other matter other than matters that were assessed or regarded for the original application	The test activity operations and associated test pads will not result in a substantially different development will not cause assessment against any other matter than matters that were assessed or regarded for in the original application.
public notification if public notification was not required for the original development application	The original application was subject to public consultation, the OCG did not receive any submissions in relation to the BOS launch facility. Given the change proposed, it is not considered that the public consultation phase applies.

5.5 Launch and Test Vehicle

Launch Vehicle

The launch vehicle for the BOS Launch Facility is Gilmour Spaces' Eris Launch Vehicle, which can deliver payloads between 100 kg and 300 kg into orbit for commercial and military clients and will have the flexibility to offer rideshare launch services to combinations of lighter payloads.

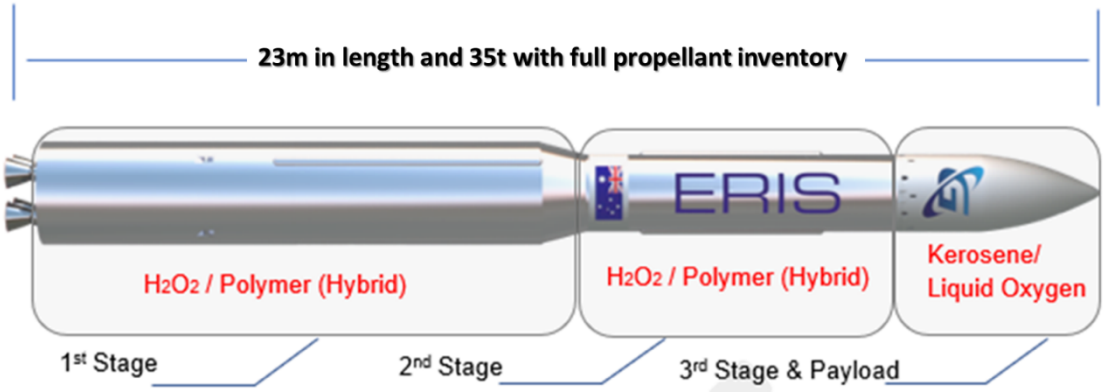


Figure 7: Launch Vehicle – Eris (Source: Gilmour Space)

The constituent components of Eris rockets and spent booster stages are presented in **Table 5.5**

Table 5.5 Estimate of Material Masses of a Typical Eris 001 Rocket for Context (Source: Hazard and Risk Report prepared by Gilmour Space)

Material		Mass, kg	Mass %	Risk in Environment
Liquid Fuel and Oxidiser	Hydrogen Peroxide	25,000	-	Rapidly Decomposes to H_2O & O_2, fire or burn hazard if contacted.
	Liquid Oxygen	500	-	Rapidly evaporates to O_2, fire or burn hazard if contacted.
	Kerosene	200	-	Combustible liquid. Will ignite if temperature is above a flash temperature (~60 °C) and if an ignition source is present.
Solid Launch Vehicle Structures	Aerospace Grade Aluminium (Fuselage and structure)	3,000	44%	Stable and inert in all environments.
	PE Polymer (Solid fuel grain)	2,500	37%	Stable and inert in all environments.
	Lithium-Ion Batteries	400	6%	Fire hazard in some circumstances.
	Electric Motors (Copper/Steel)	300	4%	Stable and inert in all environments.
	Stainless Steel	300	4%	Stable and inert in all environments.
	Carbon Fibre & Resin	300	4%	Stable and inert in all environments.
	Total	**32,500**		

Test Vehicle

The test vehicle is the Eris Launch Vehicle in terms of the three stages and the liquid bi-propellant rocket engines (ERIS 3rd stage), hybrid rocket engines (ERIS 1st and 2nd stages) and mono-propellant engines (ERIS vernier engines) as well as product development and characterisation. As such, the proposed engine testing is considered to be a related and ancillary activity to the primary launch activities associated with the BOS Launch Facility.

Minor Change Assessment Table

The following table provides an assessment of the proposed test engines in the context of the definition of 'minor change', as specified in Schedule 2 of the Act.

Minor Change Criteria	Comment
would not result in substantially different development	The proposed test activity will include test campaigns on the three stages of the Eris Rocket, which is the launch vehicle that will be launched

	from the BOS Launch Facility. Testing rocket engines is critical to launch operations in terms of verification of production or flight articles and is considered to be ancillary to the launch activities associated with the BOS Launch Facility. The proposed test activities will not result in a substantially different development, due to the test activity being completed on the Eris launch vehicle.
the inclusion of prohibited development in the application	The proposed test activity, in terms of the engines to be tested, will not result in the inclusion of prohibited development.
referral to a Referral Agency, other than the Chief Executive, if there were no Referral Agencies for the original development application;	The original application was referred to a number of advice agencies for comment.
referral to extra Referral Agencies, other than the Chief Executive;	The proposed test activity, in terms of the engines to be tested, will not result in a substantially different development and will not trigger referral to extra referral agencies.
a Referral Agency to assess the application, or have regard to, any other matter other than matters that were assessed or regarded for the original application	The proposed test activity, in terms of the engines to be tested, will not cause assessment against any other matter other than matters that were assessed or regarded for in the original application.
public notification if public notification was not required for the original development application	The original application was subject to public consultation, the OCG did not receive any submissions in relation to the BOS launch facility. Given the change proposed, it is not considered that the public consultation phase applies.

5.6 Launch Paths and Drop Zones

The bounding limits of the proposed launch trajectories for the BOS are 25^{O} to 71^{O} azimuth (or 19^{O} to 65^{O} inclination) at launch. **Figure 8** below shows example flight paths for launches. The most northerly and southerly trajectories 25° and 71° azimuths respectively.

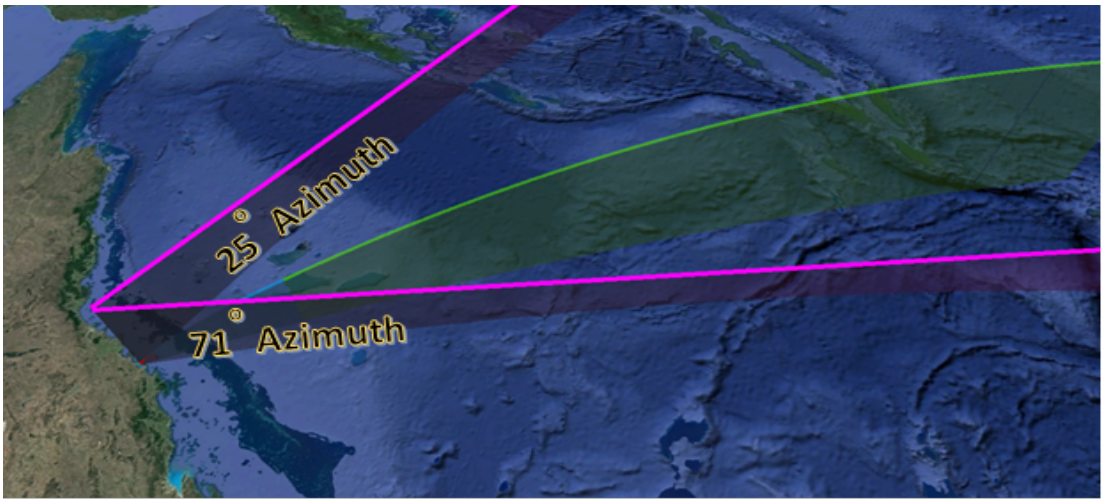


Figure 8 - Example Launch Flight Paths with Bounding Trajectories (Source: Gilmour Space)

A nominal launch will climb rapidly to reduce the effects of atmospheric drag before manoeuvring to accelerate along the selected flight path towards orbit. Eris currently is not a reusable launch vehicle, and so when Stage 1 of the vehicle expends its fuel, around two minutes into the flight,

that first stage of the vehicle will separate and complete its drop path to earth, and land within the ocean drop zone, around 200 nm (360 km) offshore. Likewise, once Stage 2 has burnt its fuel it will return to earth and even the forward fairings when they are no longer required to protect the payload, will return to earth within the drop zone. The nominal drop zone locations for the 57° flight path trajectory are shown below in **Figure 9**.

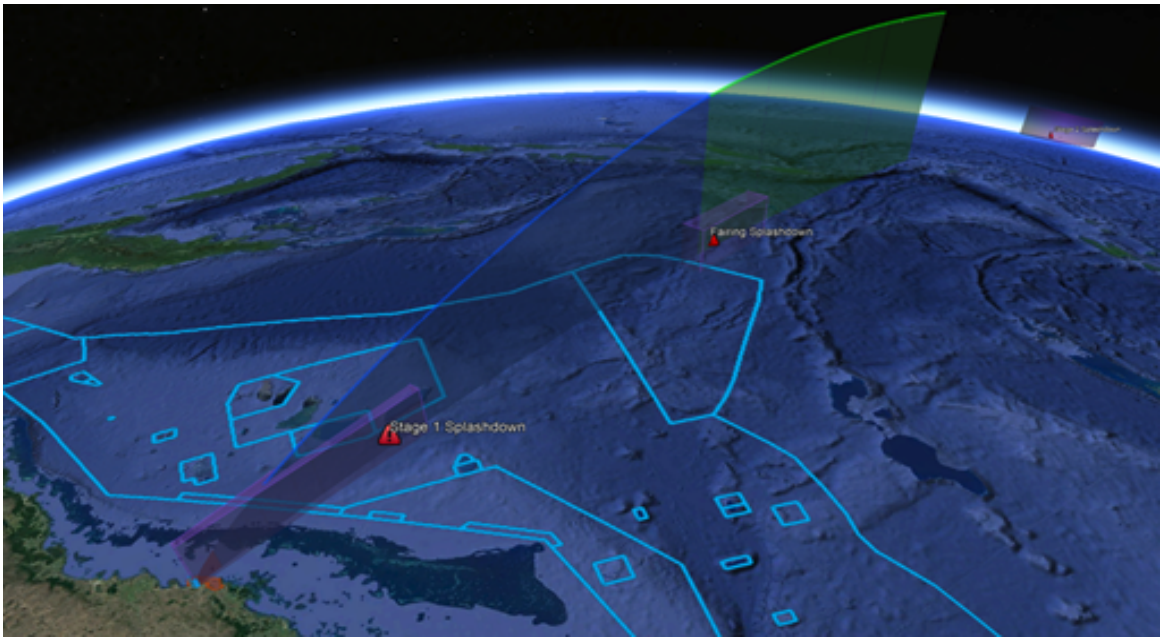


Figure 9: Example 57° Launch Trajectory Flight Path and Drop Zone Locations (Source: Gilmour Space)

The drop zone is located within the Coral Sea Marine Park (CSMP), which was proclaimed a Commonwealth Reserve under the EPBC Act in 2013, for which the relevant permits have been secured.

Test Activity

The proposed test activity will have no impact upon the launch trajectories, or the drop zone associated with launches from the BOS Launch Facility.

Minor Change Assessment Table

The following table provides an assessment of the proposed test activity in terms of launch paths and drop zones in the context of the definition of 'minor change', as specified in Schedule 2 of the Act.

Minor Change Criteria	Comment
would not result in substantially different development	The proposed test activity will have no impact upon the launch trajectories of the drop zone associated with the BOS Launch Facility, as such, the proposed test activity will not result in a substantially different development to the BOS Launch Facility Approval.

the inclusion of prohibited development in the application	The proposed test activities will not result in a substantially different development will not result in the inclusion of prohibited development.
referral to a Referral Agency, other than the Chief Executive, if there were no Referral Agencies for the original development application;	The original application was referred to a number of advice agencies for comment.
referral to extra Referral Agencies, other than the Chief Executive;	The proposed test activities will not result in a substantially different development will not trigger referral to extra referral agencies.
a Referral Agency to assess the application, or have regard to, any other matter other than matters that were assessed or regarded for the original application	The proposed test activities will not result in a substantially different development will not cause assessment against any other matter than matters that were assessed or regarded for in the original application.
public notification if public notification was not required for the original development application	The original application was subject to public consultation, the OCG did not receive any submissions in relation to the BOS launch facility. Given the change proposed, it is not considered that the public consultation phase applies.

5.7 Exclusion Zones and Range Safety

Launch Activity

During launch activity, in the interest of public safety, Gilmour Space intend to minimise public exposure to any hazards arising from launch activities. In cooperation with emergency services, local government, the Civil Aviation Safety Authority and the Australian Maritime Safety Authority, Gilmour Space will declare a series of exclusion zones. The purpose of the exclusion zones will be to protect the public from both normal launch activities and any dangers that might arise from off-nominal activity. These proposed exclusion zones will vary for each launch and the location and the extent of them will form part of each Launch Permit Application to the ASA. These are generally characterised as land, water and air exclusion zones, refer to **Figures 10 and 11**. The proposed testing activities will not impact or alter the abovementioned exclusion zones as engine testing will not be undertaken during the peak of Launch Campaigns.

Figure 10: Ground Exclusion Zone (Source: Gilmore Space)

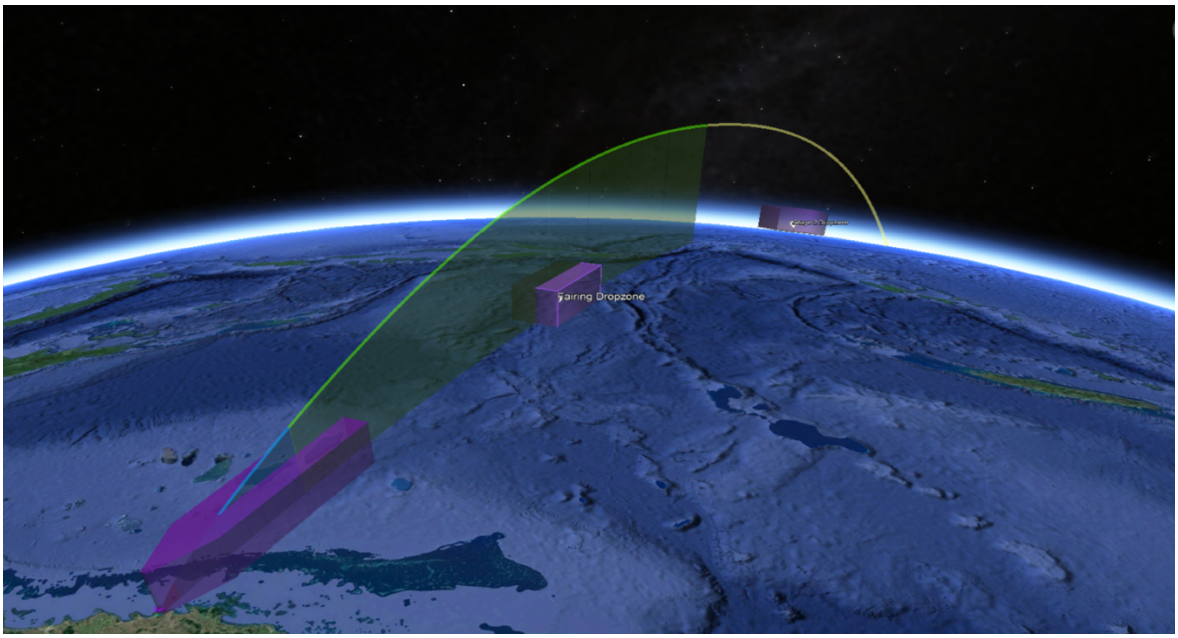


Figure 11: Indicative Sea and Air Exclusion Zones (Source: Gilmour Space)

Exclusion zones are declared in advance of the launch and broadcast via appropriate means, further commentary in relation to the exclusions is included in Section 7.

Test Activity

The Range Safety Plan details the Range Safety Organisation and responsibilities, Range Design limitations and requirements, Range Operations processes, and the capabilities of the Local Response Team.

Once the engine test pads are configured in preparation for engine test activity, in accordance with the Range Safety Plan, the range safety team will:

- sweep the hazard areas for each test to ensure the areas are clear of wildlife;
- inspect any bunding or containment measures in place to limit propagation of hazardous substances;
- conduct ground preparation (cutting long grass or wetting vegetation); and
- assume standby positions for response to any anomaly.

All test operations will be assessed through a Test Readiness Review, which considers technical, operational procedures, logistic support, safety planning and emergency response aspects of the proposed test, including review of a comprehensive risk assessment completed in line with the Gilmour Space Risk Management Policy and reviewed by the Workplace Health and Safety Officer. The Test Readiness Review assigns specific roles to the test director and test conductor and ensures consultation with range safety and BOS operations staff has been completed.

Range safety carries two key responsibilities during the conduct of test activity:
Maintenance of the safety zones - through communication, physical barriers and surveillance of the required safety area, range safety will declare the range open – authorising the test activity to commence and, in the event of any safety zone likely or actual incursion, range safety will declare an abort. Range Safety will also deactivate the safety zones once the test hazards are confirmed to be retired.

Response to Anomaly - in the event of any anomaly, Range Safety will manage the BOS response including and Emergency Response Plan actions, containment, clean up and deactivation of the safety zones when satisfied the situation has been returned to nominal conditions.

Minor Change Assessment Table

The following table provides an assessment of the proposed test activity exclusion zones/ range safety in the context of the definition of 'minor change', as specified in Schedule 2 of the Act.

Minor Change Criteria	Comment
would not result in substantially different development	The proposed test activity will not alter the exclusion zones associated with the BOS Launch Facility as test activity will not occur during the peak of Launch Campaigns. Exclusion zones per say are not required for the test activity, however there will be an internal safety zone during test activity. The proposed test activity will not result in a substantially different development to the BOS Launch Facility Approval.
the inclusion of prohibited development in the application	The proposed test activity will not result in the inclusion of prohibited development.
referral to a Referral Agency, other than the Chief Executive, if there were no Referral Agencies for the original development application;	The original application was referred to a number of advice agencies for comment.

referral to extra Referral Agencies, other than the Chief Executive;	The proposed test activity will not result in referral to extra referral agencies.
a Referral Agency to assess the application, or have regard to, any other matter other than matters that were assessed or regarded for the original application	The proposed test activity will not cause assessment against any other matter other than matters that were assessed or regarded for in the original application.
public notification if public notification was not required for the original development application	The original application was subject to public consultation, the OCG did not receive any submissions in relation to the BOS launch facility. Given the change proposed, it is not considered that the public consultation phase applies.

5.8 Control Centre

BOS Launch Facility – Launch Control Centre

Launch Control Centre (LCC) has been established on North Queensland Bulk Ports land adjacent to the Eastern Laydown Area. The LCC will house Information Technology suite and personnel, which will interact with the launch vehicle and its loading equipment for remote access and operation of the pre-launch activities, monitoring during launch and operation of any emergency management process required in the event of a mishap.

Mission control is the control of those functions required in orbit and to operate the payload. This will be functionally achieved via a separate and remote Information Technology suite likely to be located at the Gilmour Space Technologies Helensvale's Head Quarters facility.

Test Activity Control Building

When the test pads and surrounds are ready for testing to be carried out, the test team will relocate to a small donga/ container style building located in between HRE test pad and LRE test pad and complete the testing. Similar to but much smaller than the Launch Control Centre, this building will contain desks and computers to monitor test activity.

Minor Change Assessment Table

The following table provides an assessment of the proposed test activity control building in the context of the definition of 'minor change', as specified in Schedule 2 of the Act.

Minor Change Criteria	**Comment**
would not result in substantially different development	The proposed test activity will not alter the location or operations associated with the BOS Launch Facility or LCC. The proposed test activity will include infrastructure and a small donga style building located between the two test pads. The proposed test activity will not result in a substantially different development to the BOS Launch Facility Approval.
the inclusion of prohibited development in the application	The test activity infrastructure will not result in the inclusion of prohibited development.

referral to a Referral Agency, other than the Chief Executive, if there were no Referral Agencies for the original development application;	The original application was referred to a number of advice agencies for comment.
referral to extra Referral Agencies, other than the Chief Executive;	The proposed test activity infrastructure will not result in referral to extra referral agencies.
a Referral Agency to assess the application, or have regard to, any other matter other than matters that were assessed or regarded for the original application	The proposed test activity infrastructure will not cause assessment against any other matter other than matters that were assessed or regarded for in the original application.
public notification if public notification was not required for the original development application	The original application was subject to public consultation, the OCG did not receive any submissions in relation to the BOS launch facility. Given the change proposed, it is not considered that the public consultation phase applies.

5.9 Hours of Operation and Employee Numbers

BOS Launch Facility

The nominal hours of operation for the BOS Launch Facility are 6 am to 6 pm, up to seven days per week. These hours of operation allow Gilmour Space to maximise work performed on site, and to avoid the peak am and pm peak traffic associated with the shift change traffic generated by the Abbot Point Coal Terminal.

The BOS Launch Facility employs approximately 40 full time equivalent staff (FTE), with additional employees involved during Launch Campaigns.

Test Activity

Proposed engine testing will be carried out during the day, 7 am to 6 pm. The proposed test campaign team will be made up of existing BOS Launch Facility employees.

Minor Change Assessment Table

The following table provides an assessment of the proposed test activity hours of operations and employee numbers, in the context of the definition of 'minor change', as specified in Schedule 2 of the Act.

Minor Change Criteria	**Comment**
would not result in substantially different development	The proposed test activity will not alter the hours of operation or employee numbers associated with the BOS Launch Facility, as such the proposed test activity will not result in a substantially different development to the BOS Launch Facility Approval.
the inclusion of prohibited development in the application	The test activity hours of operation or staff numbers will not result in the inclusion of prohibited development.
referral to a Referral Agency, other than the Chief Executive, if there were no Referral Agencies for the original development application;	The original application was referred to a number of advice agencies for comment.

referral to extra Referral Agencies, other than the Chief Executive;	The proposed test activity hours of operation and employee numbers will not result in referral to extra referral agencies.
a Referral Agency to assess the application, or have regard to, any other matter other than matters that were assessed or regarded for the original application	The proposed test activity hours of operation or employee numbers will not cause assessment against any other matter other than matters that were assessed or regarded for in the original application.
public notification if public notification was not required for the original development application	The original application was subject to public consultation, the OCG did not receive any submissions in relation to the BOS launch facility. Given the change proposed, it is not considered that the public consultation phase applies.

5.10 Definition of Development

BOS Launch Facility

Under the APSDA scheme a launch facility is considered to be an undefined use. For the purposes of this application, the proposed development generally aligns with the definition of Launch Facility within the *Space (Launches and Returns) Act 2018:*

> ***Launch Facility*** *means a facility (whether fixed or mobile), or place specifically designed or constructed as a facility or place from which space objects can be launched and includes all other facilities at the facility or place that are necessary to conduct a launch.*

As well as launching vehicles, the BOS launch facility will also be used to assemble the launch vehicles, service and maintain the launch vehicle, test fire and prepare for launch campaigns, refer to **Table 5.4** within this section of the report for an overview of a launch campaign.

Proposed Test Activity

The proposed test activity is considered to align with the definition of Launch Facility, as it is an ancillary activity that is critical to launch operations in terms of verification of production or flight articles including liquid bi-propellant rocket engines (ERIS 3rd stage), hybrid rocket engines (ERIS 1st and 2nd stages) and mono-propellant engines (ERIS vernier engines) as well as product development and characterisation.

Minor Change Assessment Table

The following table provides an assessment of the proposed test activity land use definition in the context of the definition of 'minor change', as specified in Schedule 2 of the Act.

Minor Change Criteria	**Comment**
would not result in substantially different development	The proposed test activity will not alter the definition associated with the BOS Launch Facility, as it aligns with the Launch Facility definition. As a consequence, the proposed test activity will not result in a substantially different development in the context of the approved use definition.

the inclusion of prohibited development in the application	The proposed test activity in terms of use definition will not result in the inclusion of prohibited development.
referral to a Referral Agency, other than the Chief Executive, if there were no Referral Agencies for the original development application;	The original application was referred to a number of advice agencies for comment.
referral to extra Referral Agencies, other than the Chief Executive;	The proposed test activity use definition will not result in referral to extra referral agencies.
a Referral Agency to assess the application, or have regard to, any other matter other than matters that were assessed or regarded for the original application	The proposed test activity use definition will not cause assessment against any other matter other than matters that were assessed or regarded for in the original application.
public notification if public notification was not required for the original development application	The original application was subject to public consultation, the OCG did not receive any submissions in relation to the BOS launch facility. Given the change proposed, it is not considered that the public consultation phase applies.

5.11 Access and Traffic Generation

BOS Launch Facility

Transport and Access Management Plan (TAMP) that Gilmour Space prepared for the BOS provided an assessment of the traffic associated with the BOS Launch Facility and the likely impacts, along with any required mitigation works. This report also dealt with the truck movements associated with the transportation of the launch vehicle.

The report demonstrated that the proposed development is consistent with the intent of the APSDA Development Scheme and other relevant assessment benchmarks, as the BOS Launch Facility will not have an adverse impact on the State or local road network or railway infrastructure.

Existing Traffic and Road Network Environment

The external road network that provides access to Abbot Point Road is the Bruce Highway, which is the major north-south transport corridor from Brisbane-Cairns. The Bruce Highway is the only external road providing access into the APSDA and to the subject site. The Bruce Highway near the project area is a two-lane rural highway with a speed limit of 100 km/hr.

The Bruce Highway and Abbot Point Road intersection is a T-intersection that is traversed by two rail lines, these are approximately 30 m and 110 m from the Bruce Highway intersection and are owned by Queensland Rail and Aurizon respectively. The intersection has a left and right turn lane treatments of approximately 100 m (inclusive of tappers). Both the abovementioned roads are two way and two laned sealed roads.

Access to the BOS launch facility is along Abbot Point Road via the Bruce Highway for all operational activities.

Traffic Generation

For the purposes of the TAMP, the following assumptions were made about existing traffic:

- *391 daily two-way trips on Abbot Point Road have been adopted, assuming 3% annual growth since 2013 on 300 daily two-way trips.*
- *A 35% proportion of trips in each peak on Abbot Point has been assumed due to Abbot Point Coal Port and its operating hours of 8am – 5pm.*
- *An 8.4% proportion of trips in each peak on the Bruce Highway has been assumed as it is an average value for a highway.*

The TAMP nominated the following key assumptions for the operational stage include:

- *40 workers peak commuting one two-way trip per day where 50% of the workforce carpool from Bowen.*
- *90% of the workforce will commute outside of morning and evening peak hours of 6:15 – 7:15 AM and 4:15 – 5:15 PM, working a 6AM to 6PM shift Monday to Friday. Work times can be flexible based on observed traffic throughout operations.*
- *For workforce generation:*
  - *10% of trips are completed in a peak hour. Proposed starting and finishing times are outside of identified morning and evening peak hour traffic.*
  - *80% of trips are inbound during AM period and outbound during the PM period.*
- *For all other traffic generation:*
  - *10% of trips are completed in a peak hour.*
  - *Inbound and outbound trips are evenly split.*
  - *100% of plant items and construction materials deliveries will occur outside of peak hours.*

Table 5.11 – Operational Phase Total VPD (Source: Transport and Access Management Plan prepared by Gilmour Space)

Total Light Vehicles	20 vpd	20 vehicles based on 1 week peak
Total Heavy Vehicles	1/2 vpd*	50 vehicles over 90 days

The traffic volumes identified in the TAMP for the operational stage, provide for a realistic volume of the additional vehicular traffic associated with the BOS Launch Facility. The TAMP demonstrated that the increase in background traffic and vehicles entering Abbot Point Road was below the 5 % threshold limit for assessment.

Access

There is an existing access and vehicular track from Abbot Point Road servicing Hillery's Quarry, which traverses Lots 8 and 9 on SP295408. This existing access is utilised to service the BOS Launch Facility. An access has been constructed on the shared boundary of Lots 9 and 10 on SP295408 and the access track traverses Lot 10 on SP295408 providing access to the BOS Launch

Facility. The proposed access track within Lot 10 on SP295408 is approximately 1.15 km in length. The configuration of the access is illustrated in **Figure 13**.

Figure 13: Access and Driveway Configuration (Source: Google Maps).

Road Haul Routes

Primary Haul Routes are likely to be the haul roads located through Emerald and Collinsville which lead to Bowen. It is possible that the Bruce Highway may be used where appropriate and safe to do so. The main haulage items will be launch fluids and the three launch vehicle stages, which will be transported and delivered to the site from locations in southeast Queensland. Other materials and supplies will be sourced from local or regional areas including potentially Townsville and Mackay.

It is not anticipated that there will be a requirement to use road train, or B-Double vehicles, or oversize or heavy loads for the BOS Launch Facility.

Impacts on Traffic and Site Access

The findings of the TAMP demonstrated that the traffic generations associated with the operational phase of the project are fairly low and that the existing road network, the Bruce Highway and Abbot Point Road, have sufficient capacity to cater for the traffic demands associated with the BOS Launch Facility.

The Bruce Highway and Abbot Point Road intersection is the only point of access to Abbott Point Road and the subject site. The existing design and configuration of the intersection is adequate in terms of queuing lengths and sightlines, the impact of the BOS launch facility on this intersection will be negligible and the additional traffic generation from the proposed changed development does not warrant the existing intersection to be upgraded. Further, Abbot Point

Road is of a sufficient width and a suitable standard to cater for the traffic generation associated with the BOS Launch Facility (inclusive of the proposed test activity), noting the existing access serving the site will be utilised.

On-site Vehicle Manoeuvrability and Vehicle Parking

The internal access track layout and width are sufficient to ensure that all vehicles can enter and exit the site in forward gear. In terms of car parking spaces these will be provided to the north, south and east of the VAB.

Test Activity

Traffic Generation

The proposed engine testing will be carried out during the day, 7 am to 6 pm. The proposed test campaign team will be made up of existing BOS Launch Facility staff, meaning no additional vehicle movements in terms of employees. Further the vehicles movement associated with the three stages of the launch vehicle will be maintained under the traffic/ vehicle movement thresholds nominated in the TAMP prepared by Gilmour Space.

Access

Access to the test pads will be via the existing access and driveway servicing the BOS Launch Facility and the fire trails that have been established around the BOS Launch Facility on Lot 10 on SP295408. The fire trail starts immediately to the north of the existing security gates and entrance to the BOS Launch Facility, refer to **Figure 5**.

Road Haul Routes

As per the BOS Launch Facility.

Traffic and Site Access

The proposed test activity will not result in any impact in terms of traffic or the site access, given the test activity team will comprise of employees already on site at the BOS Launch Facility.

On-site Vehicle Manoeuvrability and Vehicle Parking

The proposed test activity will not result in any changes to the internal access track layout in terms of functionality, efficiency and safety. Informal parking (3-5 employees) will occur at the test pad locations during the test campaigns.

Minor Change Assessment Table

The following table provides an assessment of the proposed test activity traffic thresholds and access arrangements in the context of the definition of 'minor change', as specified in Schedule 2 of the Act.

Minor Change Criteria	Comment
would not result in substantially different development	The proposed test activity will operate within the traffic thresholds and access arrangements associated with the BOS Launch Facility, as such the proposed test activity will not result in a substantially different development.
the inclusion of prohibited development in the application	The proposed test activity in terms of traffic and access will not result in the inclusion of prohibited development.
referral to a Referral Agency, other than the Chief Executive, if there were no Referral Agencies for the original development application;	The proposed original application was referred to a number of advice agencies for comment.
referral to extra Referral Agencies, other than the Chief Executive;	The proposed test activity in terms of traffic and access will not result in referral to extra referral agencies.
a Referral Agency to assess the application, or have regard to, any other matter other than matters that were assessed or regarded for the original application	The proposed test activity in terms of traffic and access will not cause assessment against any other matter other than matters that were assessed or regarded for in the original application.
public notification if public notification was not required for the original development application	The original application was subject to public consultation, the OCG did not receive any submissions in relation to the BOS launch facility. Given the change proposed, it is not considered that the public consultation phase applies.

5.12 Earthworks

BOS Launch Facility

Earthworks associated with the BOS Launch Facility have been completed and where approved by Whitsunday Regional Council through an Operational Work Permit.

Environmental Management

The environmental values associated with the BOS Launch Facility site are those of the Caley Valley Wetlands and Saltwater Creek waterway, which are located adjacent to the northern boundary of the site. As such, to manage and minimise the potential impact on these environmental values, the BOS Launch Facility and associated infrastructure, has been developed on the elevated areas within the southern portion of the site.

The access track from Abbot Point Road to the BOS Launch Facility crosses over a seasonally dry watercourse which captures runoff from Mount Little into the Caley Valley Wetlands catchment. A low impact floodway has been established at this location that was designed and constructed to the requirements of the accepted development code for Waterway Barrier Works, so not to impact upon fish passage and movement.

Test Activity

Earthworks associated with the test pads were minimal in nature and are illustrated on the proposal plans, refer to **Appendix 5**. Under the Abbot Point SDA there are a range of associated

self assessable development, once a Material Change of Use has been approved, which include earthworks and the like.

Environmental Management

The environmental values associated with the test pad locations are those of the Caley Valley Wetlands and Saltwater Creek waterway, which are located adjacent to the northern boundary of the site. The proposed test pads are sufficiently setback from the north boundary of Lot 10 and noting that for each campaign there will be a Test Readiness Review that considers technical, operational procedures, logistic support, safety planning and emergency response aspects of the proposed test including review of a comprehensive risk assessment completed in line with the Gilmour Space Risk Management Policy and reviewed by the Workplace Health and Safety Officer. The test pads also maintain an appropriate separation distance to the Wetland and Wetland Buffer area.

Minor Change Assessment Table

The following table provides an assessment of the proposed test activity earthworks in the context of the definition of 'minor change', as specified in Schedule 2 of the Act.

Minor Change Criteria	**Comment**
would not result in substantially different development	The earthworks associated with the proposed test activity will not result in a substantially different development to the BOS Facility.
the inclusion of prohibited development in the application	The earthworks associated with proposed test activity will not result in the inclusion of prohibited development.
referral to a Referral Agency, other than the Chief Executive, if there were no Referral Agencies for the original development application;	The original application was referred to a number of advice agencies for comment.
referral to extra Referral Agencies, other than the Chief Executive;	The earthworks associated with the proposed test activity will not result in referral to extra referral agencies.
a Referral Agency to assess the application, or have regard to, any other matter other than matters that were assessed or regarded for the original application	The earth works associated with the proposed test activity will not cause assessment against any other matter other than matters that were assessed or regarded for in the original application.
public notification if public notification was not required for the original development application	The original application was subject to public consultation, the OCG did not receive any submissions in relation to the BOS launch facility. Given the change proposed, it is not considered that the public consultation phase applies.

5.13 Soil Erosion and Sediment Control

BOS Launch Facility

Erosion and sediment control management for the BOS Launch Facility was implemented in accordance with the Sediment and Erosion Control plan prepared by i^3 Consulting Pty Ltd.

Erosion and Sediment Control Management Strategy

Based on the findings of the erosion and sediment control assessment, the ESCMP included a management strategy that outlines how erosion and sediment control would be managed at the BOS Launch Facility, during both the construction and operational phases with the strategy including the following objectives and performance criteria:

Objectives

The key objectives of the strategy was to:

- minimise erosion and control the movement of sediments and other contaminants.
- limit the impact of construction and operational activities on the aquatic environments adjacent to and downstream of the works.

These would be achieved by:

- Identification of activities that may contribute to erosion, sedimentation, and water quality impacts.
- Implementation of controls for the avoidance of erosion, sedimentation, and water quality impacts.
- Implementation of organised, integrated, and systematic processes to manage and review the implementation of controls for avoidance.

Performance Criteria

The performance of the implementation of this strategy would be measured by the below criteria:

- Erosion and sediment loss from work areas to adjacent non-work areas is controlled.
- Any potentially contaminated waters or soils are controlled and managed to ensure no offsite release.
- No lasting effects on water quality of adjacent waterways are experienced because of activities.
- No visible increase in the turbidity of marine and or surface waters due to construction or operational activities.

Activities, Impacts and Management Actions

The ESCMP's management strategy includes the table overleaf, which summaries for the different components of the BOS launch facility the following:

- Activities;
- Potential impacts; and

- Actions.

The ESCMP demonstrated that there are appropriate management measures/ solutions that could be adopted and implemented to appropriately manage erosion and sediment control, in accordance with the required standards.

Test Activity

In the context of the site works associated with the proposed test activity, impacts in terms of erosion and required sediment control are considered to be low. If any soil erosion and sediment control works are required these will align with the applicable parameters and actions implemented for the BOS Launch Facility.

It is not considered that this component/ matter require assessment against the Minor Change Assessment test.

5.14 Flooding and Stormwater

BOS Launch Facility

Flooding

Flooding and stormwater have been previously assessed and modelled for several other projects within the APSDA and these reports were used by FYFE, to form a baseline to understand the flood and stormwater risks and mitigation/ management requirements for the subject site. The report demonstrates that the BOS Launch Facility to be consistent with the intent of the by the APSDA Development Scheme.

Approximately 50% of the subject site is below the 3 m AHD level and as such may experience flooding in a peak flood. The highest astronomical tide line encroaches into the northern portion of the Lot 10 from Saltwater Creek, the launch and utilities pads for temporary fluids storage during a launch activity are above 4.5 m AHD, and launch buildings are above 7.5 m AHD.

Stormwater Quantity and Quality

The stormwater drainage infrastructure for the BOS Launch Facility has been designed generally in accordance with the requirements as set out in the Queensland Urban Drainage Manual as required by the Abbot Point State Development Area Scheme and the Whitsunday Regional Council Development Manual and approved by Whitsunday Regional Council.

Test Activity

Flooding

Both the concrete test pad areas are above the 3 m AHD level and as such should not experience flooding in a peak flood. It is not considered that the test pads will impede the flow of flood

waters. Prior warning of any significant whether events will allow the Applicant to organise for any infrastructure items on the test pads to be removed and relocated to the BOS Launch Facility.

Stormwater Quantity and Quality

It is not considered that the two test pads, given the areas associated with them, will impede the flow or alter the directional flow of water across the site. Also, the test activity will have limited impact in terms of stormwater quality.

Minor Change Assessment Table

The following table provides an assessment of the proposed test activity flooding and stormwater arrangements in the context of the definition of 'minor change', as specified in Schedule 2 of the Act.

Minor Change Criteria	**Comment**
would not result in substantially different development	The proposed test activity will not alter the flooding or stormwater regime associated with the BOS Launch Facility and subject site, as such it will not result in a substantially different development.
the inclusion of prohibited development in the application	The proposed test activity, in terms of flooding and stormwater will not result in the inclusion of prohibited development.
referral to a Referral Agency, other than the Chief Executive, if there were no Referral Agencies for the original development application;	The original application was referred to a number of advice agencies for comment.
referral to extra Referral Agencies, other than the Chief Executive;	The proposed test activity in the context of flooding and stormwater, will not result in referral to extra referral agencies.
a Referral Agency to assess the application, or have regard to, any other matter other than matters that were assessed or regarded for the original application	The proposed test activity in the context of flooding and stormwater, will not cause assessment against any other matter other than matters that were assessed or regarded for in the original application.
public notification if public notification was not required for the original development application	The original application was subject to public consultation, the OCG did not receive any submissions in relation to the BOS launch facility. Given the change proposed, it is not considered that the public consultation phase applies.

5.15 Wastewater and Water Services

BOS Launch Facility

Wastewater Services

The BOS Launch Facility is adequately serviced via an on site septic tank.

Water Services

The BOS Launch Facility is adequately serviced by a portable water supply in the form of water tanks.

Test Activity

Wastewater Services

The Test Activity will utilise the amenities in the VAB.

Water Services

The Test Activity will utilise the amenity and kitchen facilities in the VAB.

It is not considered that this component/ matter require assessment against the Minor Change Assessment test.

5.16 Utilities

BOS Launch Facility

Power

The BOS Launch Facility is serviced via a standalone power system comprising of a solar and battery infrastructure, with the support of a diesel generation package, which is situated to the south of the VAB.

There are 66 kV and 11 kV power line connections available along Abbot Point Road and Newlands Rail system, the intent is to extend these overhead power lines to supply the BOS Launch Facility, the proposed works are scheduled for the latter part of this year.

Telecommunications

The BOS Launch Facility is serviced by its own 24 m high telecommunication tower, which is located to the east of the VAB.

Test Activity

Power

Each test pad will be reliant on generators for a source of power.

Telecommunications

The proposed test activity will be serviced by the existing 24 m high telecommunication tower, which is located to the east of the VAB.

It is not considered that this component/ matter require assessment against the Minor Change Assessment test.

5.17 Landscaping

BOS Launch Facility

Landscaping associated with the launch facility, included the revegetation of disturbed groundcover from construction, through the planting of native trees, bushes and scrubs, to allow the root network to stabilise the underlying soils. This will limit erosion and reduce downstream sediment flows and preserve the natural characteristics of the land. Regular maintenance of the landscaped areas minimises any bushfire risk and ensure the site is well presented at all times.

Test Activity

There is no landscaping associated with the proposed test activity, as the test pads are located along the existing fire trail.

It is not considered that this component/ matter require assessment against the Minor Change Assessment test.

5.18 Community Amenity Impacts

BOS Launch Facility

The subject site is not located within close proximity to any sensitive receptors, in terms of the potential to compromise existing amenity associated with noise or visual outlook. The day to day operations associated with the BOS launch facility are considered to align with the scale of a low or medium impact industry use.

Simpson Engineering Group (SEG) prepared a Noise, Vibration and Air Quality Assessment (NVAQA), to support the development application for the BOS Launch Facility. The NVAQA identified a number of receptors within proximity to the launch facility, refer to **Table 5.18** overleaf.

Table 5.18 – Relevant Receptors and Proximity to Launch Operations (Source: NVAQA prepared by SEG)

Receptor	Description	Approximate Distance and Bearing from Launch Pad [m, Degrees]
R1	Sensitive receptor, Dwelling	3,700m 135°
R2	Sensitive receptor, Dwelling	4,100m 140°
R3	Sensitive receptor, Dwelling	4,400m 150°
R4	Sensitive receptor, Dwelling	4,800m 165°
R5	Sensitive receptor, Dwellings, Queens Beach	11,800m 95°
R6	Sensitive receptor, School	8,300m 145°
R7	Sensitive receptor, Bowen Township	13,800m 110°
R8	Industrial Use, Abbott Point Coal Terminal	7,200m 330°
R9	Geographical feature, Northern property boundary & creek	450m 15°
R10	Geographical feature, Beach North of Launch Pad	1,800m 5°
R11	Industrial Use, Quarry	820m 270°

Existing Noise Environment

The NVAQA, identified the existing noise environments within the locality of the subject site, being the quarry immediately to the south of the launch facility, to the west Abbot Point Road and the railway line and to the north west Abbot Point Coal Terminal.

In terms of existing ambient noise levels for receptors R1 to R4, these are identified by SEG as being representative of rural residential areas with low density traffic and commercial uses. The report identifies the assumed existing rating background level (RBL) for R1 to R4 to be:

- *Day - Monday to Sunday 7 am to 6 pm – 40 dB(A).*
- *Evening - Monday to Sunday 6 pm to 10 pm – 38 dB(A).*
- *Night - Monday to Sunday 10 pm to 6 am – 30 dB(A).*

Existing Vibration Environment

The existing vibration environment included the Newland's rail line, that has the capacity to carry 19 return trips per day, however this existing activity is not likely to impact on any sensitive receptors. The existing blasting at the quarry to the south of the launch facility, is the main vibration source, however based on existing blasting guidelines and the distance R1 to R4 are from the quarry, it is likely that the blasting activities comply with vibration levels of 5mm/s at all sensitive receptors.

Existing Air Quality Environment

The main air pollutants associated with the launch activities, will in the main be carbon monoxide and carbon dioxide, which are both components of the rocket exhaust, as a consequence, it was these air pollutants that were assessed for the existing air quality environment.

Noise Impacts

Launch activities will generate the loudest noise at the BOS Launch facility. The NVAQA outlined and addressed the relevant legislative requirements in relation to noise managing and mitigating noise, notably the *Environmental Protection Act 1994* and the *Environmental Protection (Noise) Policy 2008***.**

For the purposes of the NVAQA, at a distance of 7 km from the BOS Launch Site, the noise associated with a launch is expected to be observed as similar to that associated with an aircraft departure.

SEG developed a digital terrain noise model of the site and surroundings using appropriate software to assist with the noise assessment for the BOS launch activities. To inform and validate modelling of source sound levels for launch activities, acoustic monitoring was established and undertaken at Gilmour Space's Rocket Development and Testing Facility, during a full flow hybrid booster rocket test. The predicted source sound power level in dB for the Gilmour Space Technologies hybrid motor is 179 dB (A) based on the NASA SP8072 methodology.

In terms of the noise modelling within the NVAQA it addressed launches up to 20 km altitude, because beyond this altitude, there is insufficient atmosphere to effectively transmit noise. The noise modelling completed by SEG is also based on the following three scenarios:

- *an omnidirectional noise source travelling through the flight trajectory with the noise level representing the highest noise level at 40 to 50 degrees off axis.*
- *no forward flight noise reduction effects.*
- *no doppler noise reduction effect.*

The resulting noise levels at selected receptors R1 to R11 are contained in **Table 5.18.1** overleaf.

Table 5.18.1 – Calculated Noise Levels at R1 to R11 (Source: NVAQA prepared by SEG)

Receptor	Description	Calculated L_{Amax} [dB(A)]	Calculated SEL [dB(A)]
R1	Sensitive receptor, Dwelling	94	105
R2	Sensitive receptor, Dwelling	92	104
R3	Sensitive receptor, Dwelling	91	103
R4	Sensitive receptor, Dwelling	90	101
R5	Sensitive receptor, Dwellings, Queens Beach	78	94
R6	Sensitive receptor, School	83	96
R7	Sensitive receptor, Bowen Township	78	94
R8	Industrial Use, Abbott Point Coal Terminal	85	98
R9	Geographical feature, Northern property boundary & Saltwater creek	120	124
R10	Geographical feature, Beach North of Launch Pad	104	112
R11	Industrial Use, Quarry	115	119

Based on the results of the noise modelling, launch activities are expected to cause elevated noise levels in the immediate vicinity of the launch site, for a short duration of time.

The NVAQA anticipated that the receptors listed in **Table 5.18.1** will experience the following noise levels during a launch:

- *Saltwater Creek and the beach areas to the north, are anticipated to experience maximum noise levels of between 120 dB(A) and 105 dB(A) respectively. At these locations it would not be suitable for individuals to be outdoors without hearing protection, which would also be the position during quarry blasting activities.*
- *Abbott Point Coal Terminal is predicted to have low noise impact (based on the SEL) and a maximum noise level of 98 dB(A). The maximum noise levels occurring from the launch is similar in magnitude to a Boeing 737-300 at 1km from the runway and under the flightpath. This site has numerous high noise generating activities may likely be noisier than the rocket when close to those sources.*
- R*eceptors R1 to R4, the maximum noise level exposure will be between 90 dB(A) and 94 dB(A), which is similar to the noise level from a Boeing 737-300 between 2.5km and 3km from the runway and under the flightpath*'. *It is noted that launch activities will be infrequent events that will be highly scheduled, with exclusion zones implemented, which will mitigate and limit exposure to impacts during launch activities.*
- *The noise level at receptor R6 the school is likely to be exposed to a maximum noise level of 83 dB(A), similar to a Boeing 737-300 at 6km from the runway and under the flightpath.*

- *Queens Beach and Bowen is likely to be a maximum of 78 dB(A), meaning the maximum noise levels occurring from the launch at the said locations will be similar to a Boeing 737-300 at 7.5km from the runway and under the flightpath.*

The NVAQA included a comparison with a jet commonly used in Australia and noting the noise from the launch occurs only a few times per year, rather than regularly throughout the day. The NVAQA stated that '*the noise impacts from the rocket launch will be much lower for receptors to the spaceport than for receptors close to airports due to low frequency of occurrence*.

Based on the conclusions of the NVAQA, noise levels associated with the launch activities, due to the associated duration, are considered to be acceptable, given they will be of a similar level, frequency and duration to those experienced at airports when planes take off. The NVAQA recommended that adequate notice of launch activities be provided to sensitive receptors, key stakeholders and the local and wider community, through media and social media. Further, exclusion zones will need to be established in accordance with the requirements of the Launch Permit.

Background noises associated with the surrounding locality, in particular the frequent blasting activities at the adjoining quarry will have a more ongoing and prolonged impact in terms of noise than the launch activity.

Vibration Impacts

The NVAQA provided an assessment of the vibration impacts from a launch activity. The NVAQA outlined the recommended vibrations levels for specific infrastructure in order to understand any likely impacts, such infrastructure included railway lines and roads. A launch activity will likely generate the following two sources of ground vibration, ignition pulse and conversion of air-borne acoustical energy into ground vibration.

The launch vehicle will not produce a significant peak (or pulse) on ignition, the thrust will develop gradually and will generally maintain a constant pressure in the launch pad, as such the ignition aspect of launch, will not result in noticeable ground vibration.

During a launch acoustic energy generated over the surface of the launch pad and launch structure will vary over time and will rapidly reduce as the launch vehicle gains altitude. The acoustic levels associated with a launch will be mitigated through the use of a water deluge system during the initial phase of the launch. The launch pad will have an appropriate acoustic suppression system and the launch vehicle exhaust will reduce the sound power.

The NVAQA demonstrated that the vibrations from a launch will generally not be measurable beyond the launch facility and therefore are unlikely to be significant environmentally. SEG

concluded that '*the assessment of vibration impacts has identified this as a minor environmental impact. The proposal is acceptable with respect to vibration'*.

The Hazard and Risk Plan (HRP) prepared by Gilmore Space for the BOS Launch Facility, also addressed the impacts from the vibrations associated with a launch. The HRP states the following in relation to vibration *'Ground vibration was considered as a potential impact to infrastructure and natural sensitive receptors within the APSDA, coastal and marine environments. Conservative calculations, which assume the highest possible ground transmissibility using the methodology within AS2187.2 produce a potential maximum ground vibration value (34mm/s), greatly below the recommended threshold criteria of 100 mm/s[4] established as the threshold peak particle velocity for infrastructure. Impacts from ground vibration to downstream infrastructure or environments are not considered significant risks and are as low as reasonably practicable'*.

Air Quality Impacts

To determine air quality impacts associated with the BOS Launch Facility, a model of the site air movements were calculated for the simulation year of 2020. Based on the model NVAQA were able to determine the rate of material that would likely to be emitted during a launch. The NVAQA concluded the modelling results indicate compliance with all air quality objectives and air quality goals of *Safework Australia, National Environment Protection (Ambient Air Quality) Measure, and Queensland Environmental Protection (Air) Policy 2019*.

Based on the findings and conclusions of the NVAQA prepared by SEG, it is considered that the BOS Launch Facility is able to support the achievement of the relevant noise and air quality objectives of *the Environmental Protection (Noise) Policy 2008* and *the Environmental Protection (Air) Policy 2008.*

Visual Amenity

The subject site is located within the APSDA, where large scale industrial development is anticipated. There are no residential dwellings within the APSDA so as such the BOS Launch Facility will have minimal impact on the visual amenity of sensitive receptors.

The BOS Launch Facility complements the APSDA environment and does not visually detract from it. Given the location of the buildings and structure, these not visible from Abbot Point Road.

Rocket launch

APSDA and the BOS Launch Facility are not accessible to the general public, as such a launch activity is expected to have minimal negative impact on the local and regional community.

There are no sensitive receptors within immediate proximity to the BOS Launch Facility and the launch activities will present a visual spectacle for around 2-3 minutes after launch. The

community over time will potentially experience the economic effects of increased industrial demand and potential tourism growth for the region.

As part of the Launch Campaign Permit application, exclusion zones will be determined and these are categorised as ground, water and air, in the interests of public safety and to minimise impacts on key stakeholders and associated operations.

Traffic

The TAMP developed by Gilmour Space notes that there will be an increase in vehicle movements as a consequence of the BOS Launch Facility. The bussing and carpooling of employees and deconfliction with peak traffic periods, reduce vehicle movements to and from the BOS Launch Facility. The proposed increase in traffic will have a negligible impact in terms of on the amenity of the local community.

Gilmour Space prepared an Environmental Management Plan (EMP), refer to **Appendix 6** in accordance with the requirements of Condition 12 of APC2022/007. The EMP contains the following policies and plans:

- Gilmour Space's Environmental Policy;
- Ambient Air Quality Management Plan;
- Noise and Vibration Management Plan;
- Stormwater Management Plan;
- Waste Management Plan;
- Hazardous and Dangerous Goods Management Plan;
- Site-based Land and Pest Management Plan;
- Decommissioning and Rehabilitation Plan;
- Bushfire Management Plan; and
- Flora and Fauna Management Plan.

The EMP and the abovementioned plans and policies, will assist in monitoring and managing any amenity, environmental and natural that may arise.

Test Activity

The existing environs in terms of noise, vibration and air will be the same for the proposed test activity as they were/ are for the BOS Launch Facility.

Noise Impacts

The proposed test activities will generate noise for a short duration of time, with the generated noise levels being lower than those associated with launches, as a consequence, Simpson Engineering Group (SEG) have prepared a supplementary Noise Assessment (NA) for the proposed test activity, refer to **Appendix 7**.

For the purposes of the NA the noise modelling receptors are outlined in Table 1 of the NA, refer below:

Table 1: Noise Modelling Receptors

Receptor	Description	Receptor	Description
R1	Dwelling	R6	Dwelling
R2	Dwelling	R7	Dwelling - Bowen
R3	Dwelling	R9	Site Boundary North
R4	Dwelling	R10	Beach North
R5	Dwelling - Bowen	R11	Quarry Office

The proposed engine test activity will be designed to comply with the site licence conditions, which are outlined in Table 4 of the NA, refer below.

Table 4: Noise Level Limits

Noise Index	Noise Level Limit in dB(A) at Places	
	Sensitive Place	Commercial Place
L_{Amax}	96	115
SEL	110	115
Day Night Average Sound Level (DNL)	70	80

The L_{Amax} is appropriate for community noise assessment of distinct events, such as a rocket tests. This metric represents the highest A-weighted integrated sound level for the event in which the sound level changes value with time. The L_{Amax} metric indicates the maximum sound level occurring for a fraction of a second. The maximum sound level is important in judging the interference caused by a noise event with conversation, TV or radio listening, sleep, or other common activities.

The SEL is a composite metric that represents both the intensity of a sound and its duration. Individual time varying noise events (e.g., aircraft overflights) have two main characteristics: a sound level that changes throughout the event and a period of time during which the event is heard. SEL provides a measure of the net impact of the entire acoustic event, but it does not directly represent the sound level heard at any given time.

The DNL is the day-night average sound level (DNL) noise metric is used to reflect a person's cumulative exposure to sound over a 24-hour period, expressed as the noise level for the average day of the year. The DNL is the time-average sound level, in decibels, over a 24 hour period (from midnight to midnight), obtained after the addition of 10 decibels to sound levels in the night (from midnight to 7.00 am and from 10.00pm to midnight.

The NA outlines that '*rocket test engines generate significant noise from the combustion process and turbulent mixing of the exhaust flow with the surrounding air. There is a supersonic potential core of exhaust flow, surrounded by mixing region. Noise is generated in this flow. It is directional, with the highest noise levels at an angle of 40 to 50 degrees from the direction of the exhaust flow'.*

The emitted noise is modified in several ways as it propagates outward from the test engine. These effects include source directivity, geometric spreading, atmospheric absorption and ground interference to a receiver location.

The noise modelling considered four meteorological scenarios for the indicative test options nominated in the Engine Test Plan. The calculated noise levels for each engine type, daily use options and meteorological scenarios are outlined in Tables 6 to 13 of the NA, refer below and overleaf.

Table 6: Calculated L_{Amax} for Day with Wind Meteorology

Receptors	L_{Amax} in dB(A)						
	Catpack HRM	Big HRM	Small HRM	Small RCS	Big RCS	Small LRE	Big LRE
R1	27	40	23	11	23	24	35
R2	26	39	21	9	22	21	31
R3	22	35	18	6	19	18	28
R4	18	31	14	2	15	15	25
R5	38	51	43	30	44	44	56
R6	13	26	7	-6	8	8	19
R7	30	43	4	-10	5	29	40
R9	108	121	94	85	94	109	117
R10	93	106	96	87	96	96	104
R11	75	88	65	55	65	83	91

Table 7: Calculated DNL for Day with Wind Meteorology

Receptors	SEL in dB(A)						
	Option 1	Option 2(a)	Option 2(b)	Option 3(a)	Option 3(b)	Option 4 (a)	Option 4 (b)
R1	11	1	<thh	1	<thh	1	0
R2	10	<thh	<thh	<thh	<thh	<thh	<thh
R3	7	<thh	<thh	<thh	<thh	<thh	<thh
R4	3	<thh	<thh	<thh	<thh	<thh	<thh
R5	22	19	17	21	20	22	21
R6	<thh	<thh	<thh	<thh	<thh	<thh	<thh
R7	14	5	0	3	<thh	3	1
R9	92	85	78	84	70	84	78
R10	78	71	69	73	72	73	71
R11	59	58	46	57	41	57	52

Table 8: Calculated L_{Amax} for Day Meteorology

Receptors	L_{Amax} in dB(A)						
	Catpack HRM	Big HRM	Small HRM	Small RCS	Big RCS	Small LRE	Big LRE
R1	38	51	35	23	35	33	44
R2	32	45	29	17	29	28	39
R3	29	42	25	13	26	24	35
R4	23	36	20	8	21	20	30
R5	40	53	46	33	47	47	58
R6	20	33	14	1	15	15	25
R7	34	47	10	-3	12	33	44
R9	99	112	85	75	85	105	113
R10	74	87	74	64	74	74	83
R11	64	77	58	48	58	71	80

Table 9: Calculated DNL for Day Meteorology

Receptors	SEL in dB(A)						
	Option 1	Option 2(a)	Option 2(b)	Option 3(a)	Option 3(b)	Option 4 (a)	Option 4 (b)
R1	23	11	11	11	11	12	11
R2	17	6	5	6	5	6	5
R3	13	2	1	2	2	3	2
R4	8	<thh	<thh	<thh	<thh	<thh	<thh
R5	25	22	19	24	22	25	23
R6	4	<thh	<thh	<thh	<thh	<thh	<thh
R7	18	9	4	7	<thh	7	5
R9	83	80	69	80	61	80	74
R10	58	50	48	51	50	51	50
R11	49	46	36	46	34	46	41

Table 10: Calculated L_{Amax} for Neutral Meteorology

Receptors	L_{Amax} in dB(A)						
	Catpack HRM	Big HRM	Small HRM	Small RCS	Big RCS	Small LRE	Big LRE
R1	49	62	46	35	47	41	51
R2	39	52	36	24	36	35	45
R3	35	48	32	21	33	30	41
R4	28	41	25	14	26	23	33
R5	45	58	45	33	47	47	58
R6	32	45	26	14	27	25	36
R7	39	52	35	22	37	37	48
R9	100	113	86	77	86	107	114
R10	82	95	84	75	83	84	92
R11	70	83	61	51	61	74	83

Table 11: Calculated DNL for Neutral Meteorology

Receptors	SEL in dB(A)						
	Option 1	Option 2(a)	Option 2(b)	Option 3(a)	Option 3(b)	Option 4 (a)	Option 4 (b)
R1	33	20	21	22	22	22	21
R2	23	12	11	13	12	13	12
R3	20	8	8	9	9	9	8
R4	13	1	1	2	2	2	1
R5	29	22	20	24	22	24	23
R6	16	4	4	3	3	4	3
R7	23	13	11	14	12	14	13
R9	85	81	71	81	63	81	75
R10	66	59	57	61	60	61	59
R11	55	49	41	49	37	49	44

Table 12: Calculated L_{Amax} for Neutral With Wind Meteorology

Receptors	L_{Amax} in dB(A)						
	Catpack HRM	Big HRM	Small HRM	Small RCS	Big RCS	Small LRE	Big LRE
R1	36	49	32	21	33	32	43
R2	32	45	28	16	29	27	37
R3	28	41	24	12	25	23	34
R4	22	35	18	7	19	17	28
R5	39	52	44	31	46	46	57
R6	24	37	18	6	19	18	29
R7	30	43	6	<thh	8	30	41
R9	104	117	91	81	90	108	115
R10	91	104	95	86	94	94	102
R11	78	91	64	54	64	84	93

Table 13: Calculated DNL for Neutral with Wind Meteorology

Receptors	SEL in dB(A)						
	Option 1	Option 2(a)	Option 2(b)	Option 3(a)	Option 3(b)	Option 4 (a)	Option 4 (b)
R1	20	9	8	10	8	10	9
R2	16	5	4	5	4	5	4
R3	12	1	0	1	0	1	0
R4	7	<thh	<thh	<thh	<thh	<thh	<thh
R5	23	21	18	23	21	23	22
R6	8	<thh	<thh	<thh	<thh	<thh	<thh
R7	14	5	0	4	-17	4	2
R9	88	83	74	82	67	82	76
R10	76	69	67	72	71	72	70
R11	62	59	48	59	40	59	53

The noise modelling indicates that the noise level limits (L_{Amax} and DNL) at all sensitive receptors are likely to be readily met. Similarly, the noise levels at commercial receptors readily comply with the noise limits.

The NA concludes the following in terms of the noise modelling findings for the proposed test activity and sensitive receptors and commercial receptors:

Sensitive Receptors

The highest noise level is likely to be an L_{Amax} of 62 dB(A) at R1 during neutral meteorology for the Big HRM. This engine is usually tested over 120 seconds. Assuming a constant sound output over 120 seconds, the SEL would be 21 dB(A) higher, i.e. an SEL of 83 dB(A), readily complying with the residential SEL limit of 110 dB(A). The highest L_{Amax} noise levels of 62 dB(A) would be similar in intensity to a quiet traffic or a washing machine.

Commercial Receptors

The highest noise level is likely to be an L_{Amax} of 91 dB(A) at R11 during neutral with wind meteorology for the Big HRM. This engine is usually tested over 120 seconds. Assuming a constant

sound output over 120 seconds, the SEL would be 21 dB(A) higher, i.e. an SEL of 103 dB(A), readily complying with the commercial premises SEL limit of 115 dB(A).

The highest L_{Amax} noise levels of 91 dB(A) would be similar in intensity to noisy traffic or a hand drill.

The occupational noise level goal to prevent hearing loss is an $L_{Aeq\ (8\ hour)}$ of 85 dB(A) and an LCPeak of 140 dB(A). The noise levels from rocket testing is likely to readily comply with occupational noise level goals at commercial premises.

The diagram below, sourced from the NA, provides examples of familiar and relatable noise sources and the respective sound pressure levels, to give some perspective in terms of the noise levels associated with the proposed test activity.

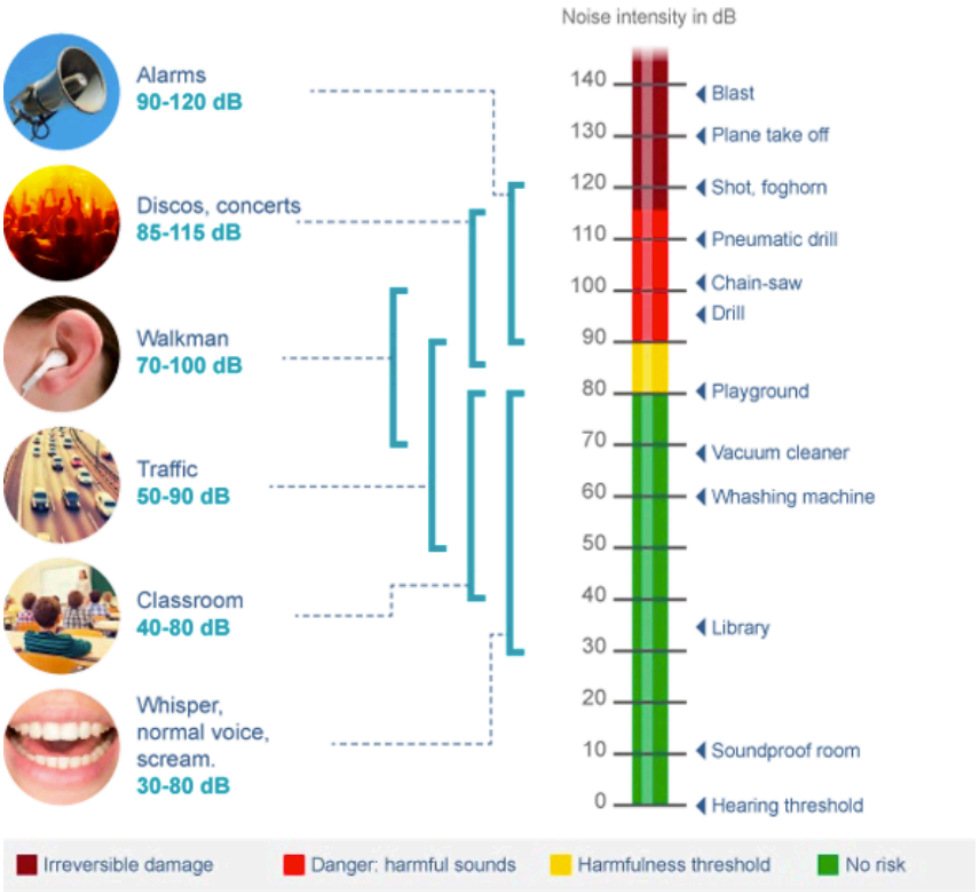


Figure 6: Examples of Noise Sources and Sound Pressure Levels(Source Cochlea.org)

Vibration Impacts

The NVAQA prepared for the BOS Launch Facility demonstrated that the vibrations from a launch will generally not be measurable beyond the launch facility and therefore are unlikely to be

significant environmentally. SEG concluded that '*the assessment of vibration impacts has identified this as a minor environmental impact. The proposal is acceptable with respect to vibration'*. Based on the above and the activates associated with the test activity it is not considered that there will be vibration impacts external to the site. resulting from the test

Air Quality Impacts

The NVAQA prepared for the BOS Launch Facility demonstrated that the air modelling results indicated compliance with all air quality objectives and air quality goals of *Safework Australia, National Environment Protection (Ambient Air Quality) Measure, and Queensland Environmental Protection (Air) Policy 2019*.

Based on the findings and conclusions of the NVAQA prepared by SEG, the BOS Launch Facility is able to support the achievement of the relevant noise and air quality objectives of *the Environmental Protection (Noise) Policy 2008* and *the Environmental Protection (Air) Policy 2008.*

Based on the above and the operations associated with the proposed test activity it is not considered that there will be air quality impacts and that Gilmour Space will be able to support the achievement of the relevant air quality objectives of *the Environmental Protection (Air) Policy 2008.*

Visual Amenity

The subject site is located within the APSDA, where large scale industrial development is anticipated. There are no residential dwellings within the APSDA so as such the BOS Launch Facility will have minimal impact on the visual amenity of sensitive receptors.

The existing BOS Launch Facility complements the APSDA environment and does not visually detract from it. Given the location of the proposed test pads, like the BOS Launch Facility these will not be visible from Abbot Point Road.

Test Activity Campaign

APSDA and the BOS Launch Facility, inclusive of the proposed test pads are not accessible to the general public, as such a test activity is expected to have minimal negative impact on the local and regional community.

Traffic

The proposed test activity will be reliant on existing employees at the BOS Launch Facility meaning no change in traffic movements to and from the site. The Eris launch vehicle will continue to be transported in stages to the BOS Launch Facility as approved.

The Environmental Management Plan (EMP) prepared by Gilmour Space has been updated to take in consideration the test activity. The EMP contains the following policies and plans:

- Gilmour Space's Environmental Policy;
- Ambient Air Quality Management Plan;
- Noise and Vibration Management Plan;
- Stormwater Management Plan;
- Waste Management Plan;
- Hazardous and Dangerous Goods Management Plan;
- Site-based Land and Pest Management Plan;
- Decommissioning and Rehabilitation Plan;
- Bushfire Management Plan; and
- Flora and Fauna Management Plan

The updated EMP and the abovementioned plans and policies, will assist in monitoring and managing any amenity, environmental and natural that may arise, refer to **Appendix 6**.

Minor Change Assessment Table

The following table provides an assessment of the proposed test activity community amenity impacts in the context of the definition of 'minor change', as specified in Schedule 2 of the Act.

Minor Change Criteria	**Comment**
would not result in substantially different development	The proposed test activity, in terms of community impacts, will not result in a substantially different development in the context of the BOS Launch Facility approval.
the inclusion of prohibited development in the application	The proposed test activity, in terms of community impacts, will not result in the inclusion of prohibited development.
referral to a Referral Agency, other than the Chief Executive, if there were no Referral Agencies for the original development application;	The original application was referred to a number of advice agencies for comment.
referral to extra Referral Agencies, other than the Chief Executive;	The proposed test activity in the context of in terms of community impacts, will not result in referral to extra referral agencies.
a Referral Agency to assess the application, or have regard to, any other matter other than matters that were assessed or regarded for the original application	The proposed test activity. in terms of community impacts, will not cause assessment against any other matter other than matters that were assessed or regarded for in the original application.
public notification if public notification was not required for the original development application	The original application was subject to public consultation, the OCG did not receive any submissions in relation to the BOS launch facility. Given the change proposed, it is not considered that the public consultation phase applies.

5.19 Management of the BOS Launch Facility

BOS Launch Facility

Gilmour Space personnel manages the launch facility. The facility is active before, during and immediately after each launch campaign for assembly, integration, test and launch of the vehicle as well as remediation of facilities and preparation for next campaign immediately after. A suite of documents for the regulation of day to day operations and activities has been developed under a Facility Management Plan including consideration for waste management, hazardous and dangerous goods management, traffic and access management, and management and operation environmental management. A further suite of documents have been developed by Gilmour Space to support activities at the launch facility, including integrated logistics, emergency response and security planning.

Waste Management

Gilmour Space prepared a Waste Management Plan (WMP) for the BOS Launch Facility. The WMP outlines the requirements and actions to sustain a compliant and responsible management and disposal of waste generated by the BOS Launch Facility. The WMP includes a Waste Management Policy, which is focused around avoiding waste, reducing waste, reusing waste and recycling waste. Waste that cannot be re-used, recycled, or treated will be separated and stored in designated waste storage areas for collection by an authorised/ licenced waste contractor.

The WMP provides a breakdown of waste based on the following three waste categories, along with waste management practices for the three waste categories:

- Regulated.
- Disposable.
- Recyclable.

Test Activity

The proposed test activity will be managed by Gilmour Spaces and the existing operational and management plans have been updated to include the test activity in order to regulate and support the day to day operations associated with the test activity, refer to **Appendix 8** for the updated Operational Management Plan Gilmour Space have prepared an Engine Test Hazard and Risk document, refer to **Appendix 9**.

Waste Management

The proposed test activity will comply with the requirements of the WMP for the BOS Launch Facility to responsibly manage and dispose of waste generated by the proposed test activity.

Minor Change Assessment Table

The following table provides an assessment of the proposed test activity waste management in the context of the definition of 'minor change', as specified in Schedule 2 of the Act.

Minor Change Criteria	Comment
would not result in substantially different development	Gilmour Space will manage the proposed test activity, meaning it will not result in a substantially different development in the context of the BOS Launch Facility approval.
the inclusion of prohibited development in the application	The proposed test activity, in terms of its management, will not result in the inclusion of prohibited development.
referral to a Referral Agency, other than the Chief Executive, if there were no Referral Agencies for the original development application;	The original application was referred to a number of advice agencies for comment.
referral to extra Referral Agencies, other than the Chief Executive;	The proposed test activity in terms of its management will not result in referral to extra referral agencies.
a Referral Agency to assess the application, or have regard to, any other matter other than matters that were assessed or regarded for the original application	The proposed test activity, in terms of its management, will not cause assessment against any other matter other than matters that were assessed or regarded for in the original application.
public notification if public notification was not required for the original development application	The original application was subject to public consultation, the OCG did not receive any submissions in relation to the BOS launch facility. Given the change proposed, it is not considered that the public consultation phase applies.

5.20 Development Plans

<u>BOS Launch Facility</u>

The approved plans for the BOS Launch Facility were prepared by i^3 Consulting and include the following:

- BOS Port Access Road Layout Plan and Launch Facility – GSLF-13C-CV-DWG-006-01 REV E;
- BOS Spaceport Site Layout Design – BOS-PADS-LAY, Sheets 1 & 2 of 3 Rev 5;
- BOS Spaceport Site Layout Design – BOS-PADS-LAY, Sheet 3 of 3 Rev 5;
- BOS Port Access Road Locality Plan and Drawing Index, as amended in red by the Department of Environment and Science – GSFL-13C-CV-DWG-001-01 Rev E;
- BOS Port Access Road Sediment and Erosion Control Typical Details – GSFL-13C-CV-DWG-002-01 Rev D;
- BOS Port Access Road Typical Notes and Details Sheet 1 of 3 – GSLF-13C-CV-DWG-003-01 Rev D;
- BOS Port Access Road Typical Notes and Details Sheet 2 of 3 – GSLF-13C-CV-DWG-003-02 Rev D;
- BOS Port Access Road Typical Notes and Details Sheet 3 of 3 – GSLF-13C-CV-DWG-003-03 Rev D;
- BOS Port Access Road Layout and Long section – Sheet 1 of 4 – GSLF-13C-CV-DWG-005-01 Rev D;
- BOS Port Access Road Layout and Long section – Sheet 2 of 4 – GSLF-13C-CV-DWG-005-02 Rev D;

- BOS Port Access Road Layout and Long section – Sheet 3 of 4 – GSLF-13C-CV-DWG-005-03 Rev D;
- BOS Port Access Road Layout and Long section – Sheet 4 of 4 – GSLF-13C-CV-DWG-005-04 Rev D;
- BOS Port Access Road – Floodway Layout Plan – GSLF-13C-CV-DWG-007-01 Rev D;
- BOS Port Access Road – Floodway Details Plan – GSLF-13C-CV-DWG-007-02 Rev D;
- Bowen Orbital Space Port Access Road Cross Sections – Sheet 1 of 3 – GSLF-13C-CV-DWG-008-01 Rev D;
- Bowen Orbital Space Port Access Road Cross Sections – Sheet 2 of 3 – GSLF-13C-CV-DWG-008-02 Rev D;
- Bowen Orbital Space Port Access Road Cross Sections – Sheet 3 of 3 – GSLF-13C-CV-DWG-008-03 Rev D;
- BOS Water Deluge System Proposed Pad Layout – BOS-PADS-LAY Rev A;
- Cover Page – S00 Rev 0;
- Project Notes – S01 Rev 0;
- General Arrangement and Elevation – S50 Rev 0; and
- Flooring Details – S100, S400 and S401 Rev 0.

Approved Report - Structural Computation Report 22-055- 24 Communication Tower at Bowen Orbital Spaceport Rev 2/1 prepared by i^3 Consulting Pty Ltd and dated 12 December 2022.

Proposed Test Activity Plans

The proposed test activity plans have been prepared by i^3 Consulting Pty Ltd, refer to **Appendix 5.** The plans include the following:

- LRE Launch Pad Earthworks Plan - 21-307-C00 Rev A;
- SIRIUS Launch Pad Earthworks Plan – 21-307-C01 Rev 1;
- SIRIUS Test Pad Slab Plan – 21-307-S130 Rev 1;
- SIRIUS Test Pad Concrete Details – 21-307-S131 Rev A;
- SIRIUS Test Pad Slab Plan – 21-307-S140 Rev A; and
- SIRIUS Test Pad Concrete Details Plan – 21-307-C00 Rev A.

5.21 Prelodgement Meeting

A prelodgement meeting was facilitated between the Office of the Coordinator-General (OCG), the Applicant's representatives and Gilmour Space, on Wednesday, 27 March 2024.

In advance of the meeting a summary of the proposed change and test activity, was provided to the OCG, along with the suite of proposal plans. An explanation of the proposed test activity was provided to the OCG, along with a description of the location of the test pads and the synergies between testing already approved as part of the BOS Launch Facility and the proposed test activity.

Due to unresolvable circumstances, which are beyond the Applicant's control, Gilmour Space are no longer able to test launch vehicle engines at the Motor Testing Facility in Helidon, which is a multi user facility, as a consequence an alternative location is required. The BOS Launch Facility is considered the most logical and practical location, given the activity is ancillary to the primary use of the BOS Launch Facility, which is launching the Eris rocket.
The OCG recommended clearly articulating in the application that the location of the test pads are appropriately sited away from the wetland and wetland buffer area and address any other relevant impacts associated with the test activity, including any additional chemical storage in the context of Schedule 15 of the *Work, Health and Safety Regulation 2011*.

The structure of the change application (minor) (application) was discussed, along with the updated supporting technical reports that will accompany the application.

6.0 ENVIRONMENTAL ASSESSMENT

6.1 Environmental Assessment

BOS Launch Facility

SMEC in conjunction with Gilmour Space prepared an Environmental Assessment Report (EA report), for the BOS Launch Facility in the context of environmental Commonwealth and State legislative requirements and the flora and fauna species, and environs associated with the site, surrounding locality and drop zones. The EA report identified a number of secondary actions/ approvals/ permits needed to be obtained based on the environmental values associated with the subject site, surrounding land and waters and legislative requirements, in advance of launches occurring, these are summarised below.

Matters of National Environmental Significance

The *EPBC Act*, nominates areas of MNES and protects them from developments or actions that will significantly impact upon areas of MNES. An action requires approval from Federal Environment Minister (DCCEEW formerly DAWE) if the action has, will have, or is likely to have a significant impact on any MNES, including listed threatened flora and fauna, migratory fauna and threatened ecological communities.

In terms of the BOS Launch Facility, in particular launch activities, Gilmour Space has secured the required EPBC Approval, which is subject to a suite of conditions moving forward.

Great Barrier Reef Marine Park and Great Barrier Reef World Heritage Park

The GBRMP and GBRWHA are located proximate to the BOS Launch Facility and launches will traverse the airspace above the property. Under normal operations no impact on the World Heritage or National Heritage Values of the property are expected, the potential actions on the GBRMP were included in the referral to DAWE (now DCCEEW). As mentioned above Gilmour Space has secure the required EPBC Approval for the BOS Launch Facility, in particular launch activities.

Coral Sea Marine Park

The drop zone for the launch vehicle is over the Coral Sea Marine Park. The CSMP Management Plan enables activities to be conducted in zones consistent with the zone objectives while enabling the impacts to be effectively managed the intent is to include the potential actions on the CSMP were included within the referral to DAWE (now DCCEEW) and Gilmour Space have secured the required CSMP Activity License.

Matters of State Environmental Significance

Schedule 2 of the *Environmental Offsets Regulation 2014* details the environmental matters that are protected under Queensland legislation. A preliminary assessment of each of MSES with respect to the BOS Launch Facility identified that clearing vegetation and the wetlands may require assessment, based on the desktop assessment and field inspection, no environmental offset condition will be imposed on the BOS Launch Facility approval issued by the OCG.

Section 10 and **Appendix 13** address the relevant MSES and State interests relevant to the subject site.

Environmental Management Plan

The EA report recommended that an Environmental Management Plan (EMP) be prepared to manage and monitor a range of potential environmental impacts. Condition 12 of APC2022/007 required the Applicant to prepare and lodge an EMP that addressed a range of environmental matters.

Gilmour Space has prepared an Environmental Management Plan (EMP) in accordance with the requirements of Condition 12 of APC2022/007 for the BOS Facility. This EMP contains the following policies and plans:

- Gilmour Space's Environmental Policy;
- Ambient Air Quality Management Plan;
- Noise and Vibration Management Plan;
- Stormwater Management Plan;
- Waste Management Plan;
- Hazardous and Dangerous Goods Management Plan;
- Site-based Land and Pest Management Plan;
- Decommissioning and Rehabilitation Plan;
- Bushfire Management Plan; and
- Flora and Fauna Management Plan.

The abovementioned policies and plans set out the requirements in terms of managing and monitoring potential risks associated with the environmental issues identified in Section 4.9 of the EMP.

Test Activity

Gilmour Space have updated the EMP to integrate the operations associated with the proposed test activity and the requirements for managing and monitoring potential risks associated with the potential environmental issues. Unlike the BOS Launch Facility, the proposed test activity is not considered to require any number of secondary environmental actions/ approvals/ permits, given testing of rockets engines at a greater intensity (in terms of the number of engines) has been approved.

Matters of National Environmental Significance

The *EPBC Act*, nominates areas of MNES and protects them from developments or actions that will significantly impact upon areas of MNES. An action requires approval from Federal Environment Minister (DCCEEW formerly DAWE) if the action has, will have, or is likely to have a significant impact on any MNES, including listed threatened flora and fauna, migratory fauna and threatened ecological communities.

The conduct of engine test will generate emissions (noise, heat, light and exhaust plumes) and may generate debris fields or explosive effects. Gilmour Space secured the services of an external provider to assess the potential and expected environmental impacts of activities at the engine test facility. This hazard and risk review is informed by that environmental assessment on engine test activities which considers the establishment of the Bowen Orbital Spaceport engine test facility against the significant impact criteria of this federal Act

It is not considered that the proposed test activity requires further assessment by DCCEEW given testing of rockets engines at a greater intensity (in terms of the number of engines) is already approved.

Great Barrier Reef Marine Park and Great Barrier Reef World Heritage Park

The test pads are located within Lot 10 on SP331993 and involve the testing of rocket engines and not any launch activities, as such the proposed test activity will not adversely impact the GBRMP or the GBRWHA.

Coral Sea Marine Park

The proposed test pads are located within Lot 10 on SP331993 and involve the testing of rocket engines and not any launch activities, as such the proposed test activity will not adversely impact CSMP.

Matters of State Environmental Significance

Schedule 2 of the *Environmental Offsets Regulation 2014* details the environmental matters that are protected under Queensland legislation. A preliminary assessment of each of MSES with respect to the Test Activity identified that clearing vegetation and the wetlands may require assessment, based on the desktop assessment, however it is not considered that an environmental offset condition would need to be imposed.

Updated Environmental Management Plan

The EMP prepared by Gilmour Spaces has been updated to include the requirements to manage and monitor a range of potential environmental impacts associated with the proposed test activity.

This updated EMP contains the following policies and plans:

- Gilmour Space's Environmental Policy;
- Ambient Air Quality Management Plan;
- Noise and Vibration Management Plan;
- Stormwater Management Plan;
- Waste Management Plan;
- Hazardous and Dangerous Goods Management Plan;
- Site-based Land and Pest Management Plan;
- Decommissioning and Rehabilitation Plan;
- Bushfire Management Plan;
- Flora and Fauna Management Plan; and
- Cultural Heritage Agreement.

The abovementioned policies and plans set out the requirements in terms of managing and monitoring potential risks associated with the environmental issues identified in Section 4.9 of the updated EMP.

Minor Change Assessment Table

The following table provides an assessment of the proposed test activity environmental impacts in the context of the definition of 'minor change', as specified in Schedule 2 of the Act.

Minor Change Criteria	**Comment**
would not result in substantially different development	The proposed test activity in the context of potential environmental impacts, will not result in a substantially different development in the context of the BOS Launch Facility approval and associated environmental impacts.
the inclusion of prohibited development in the application	The proposed test activity, in the context of potential environmental impacts, will not result in the inclusion of prohibited development.
referral to a Referral Agency, other than the Chief Executive, if there were no Referral Agencies for the original development application;	The original application was referred to a number of advice agencies for comment.
referral to extra Referral Agencies, other than the Chief Executive;	The proposed test activity, in the context of potential environmental impacts, will not result in referral to extra referral agencies.
a Referral Agency to assess the application, or have regard to, any other matter other than matters that were assessed or regarded for the original application	The proposed test activity, in the context of potential environmental impacts, will not cause assessment against any other matter other than matters that were assessed or regarded for in the original application.
public notification if public notification was not required for the original development application	The original application was subject to public consultation, the OCG did not receive any submissions in relation to the BOS launch facility. Given the change proposed, it is not considered that the public consultation phase applies.

7.0 HAZARD AND RISK

7.1 Hazard and Risk Review

BOS Launch Facility

Gilmour Space prepared a Hazard and Risk Plan (HRP) for the BOS Launch Facility to identify, characterise and quantify the associated and residual risks that may arise from the construction and operation of the BOS launch facility, to identify the potential risks, the treatment of risks and demonstrate regulatory compliance.

The activity of a spaceport and launch facility in Australia, is governed by several regulatory requirements including the *Space Act 2018* and the *Environmental Protection and Biodiversity Conservation Act 1999.* Gilmour Space conducted a risk assessment to examine the attendant and residual risks to safety and environment and to understand the ability to construct and operate the facility within the regulatory requirements.

The HRP identifies hazards, controls and treatment of the following residual risk:

- Construction of the launch facility.
- Nominal launch of a vehicle along the proposed trajectory including scheduled debris (spent rocket stages).
- Mission failure modes and effects along the flight trajectory.

Risk and Control Analysis

The HRP includes a detailed Risk Assessment, which identifies and outlines the following for the launch facility:

- Risk per project phase;
- Risk Hazard;
- Risk Description;
- Risk Impacts;
- Risk Category;
- Likelihood;
- Consequence;
- Inherent risks;
- Existing barriers or mitigation controls to reduce risk;
- Control validity;
- Likelihood;
- Consequence; and
- Residual risks.

Table 7.1 below, provides a summary of the hazards identified and the applicable risk contexts for the risk analysis.

Table 7.1: Identified Hazard for Risk Analysis (Source: Gilmour Space)

Phase & Identified Hazards	Applicable Risk Contexts				
	Personal Safety	APSDA	Coastal Env.	Marine Env.	LEO Env.
Construction and Operations					
Habitat Disruption	-	-	✔	✔	-
Soils Erosion and Sedimentation	-	-	✔	✔	-
Noise, Air Quality and Light Impact	-	✔	✔	✔	-
Chemical Contamination	✔	✔	✔	-	-
Traffic and Access Impact	✔	✔	-	-	-
Launch & Flight Activities					
Rocket Noise and Vibration	✔	✔	✔	✔	-
Hazardous and Dangerous Goods	✔	✔	✔	-	-
Thrust or Guidance Failure	✔	✔	✔	✔	-
Catastrophic Failure	✔	✔	✔	✔	-
Distant Focussing Overpressure	✔	-	-	-	-
Orbital Failure	-	-	-	-	✔

In the context of the risk associated with the launch vehicle, the HRP states the following, *the Flight Safety Code mandates that for new launch vehicle risk consideration, the probability of failure to reach a successful orbit should be considered as 25%. This probability of failure represents the sum of the probabilities of various common failure modes such as loss of guidance, loss of engine thrust, and explosion of propulsion systems. The Flight Safety Code provides a list of various typical vehicle failure modes and their probabilities. These compounded failure mode probabilities are used in this analysis to provide representative expectations of effects without actual historical flight data.*

Sections 5.3.4, 5.3.5, 5.4 and 5.4.1 of the HRP and Section 4 of the EA report appropriately addressed the impacts associated with various launch scenarios, both successful and unsuccessful launch scenarios, and measures to manage and mitigate potential impacts. Land, water and air exclusion zones will be established for launch activities, and these exclusion zone will be informed by a number of factors. Each launch permit application will need to include details of the exclusion zones and demonstrate compliance with the methodology for the design of the exclusion zones, as approved by the Australia Space Agency.

The mitigation measures to manage hazards and reduce risk are included in number of management plans that form part of the EMP Plan prepared by Gilmour Space:

- Land Management Plan;
- Environmental Management Plan;
- Hazardous and Dangerous Goods Management Plan; and
- Emergency Management Plan.

The original development application was supported by a range of technical reports that also addressed potential impacts associated with the BOS Launch Facility and recommend mitigation measures to manage hazards and reduce risk, these reports included the following:

- Transport and Access Management Plan;
- Civil Engineering Report;
- Erosion and Sediment Control Management Plan;
- Noise, Vibration and Air Quality Assessment;
- Waste Management Plan;
- Hazard and Risk Plan;
- Environmental Assessment Report; and
- Hazardous and Dangerous Goods Management Plan.

Controlling Risks

Risks were assessed and treatments identified to control exposure of sensitive environments to impacts from chemical contamination, blast effects and debris through construction of the facility, careful selection of nominal flight paths and the implementation of land, water and air exclusion zones during launch activities. The BOS launch procedures include the requirement to conduct notifications to authorities, public awareness campaigns, individual outreach to landowners / tenants, and consultations with Abbot Point SDA partner agencies, emergency services and users. They will detail the procedures for activation of land, sea and air public safety measures including land exclusion zones, Marine Traffic Management Plans and Temporary Restricted Areas. The zones will be deactivated as soon as possible after launch by the Range Safety Officer in partnership with the relevant authorities and emergency services.

In the context of time there will be two land exclusion zones i.e. a small 4 hr exclusion zone for filling operations and a larger 0.5 hr exclusion zone for launch. Land exclusion zones will be established in the minimum size for the minimum time compatible with the maintenance of Public Safety. Land exclusion zones will be established through consultation with affected landowners, emergency services, regulatory authorities and SDA users. They will be announced via public engagement and signage on access roads and at security checkpoints. They will be maintained through remote monitoring and the establishment of manned checkpoints where necessary. Where appropriate, these zones will be enforced in partnership with Queensland Police Service.

The Marine Traffic Management Plans will be established affecting the minimum water space for the minimum time compatible with the maintenance of public safety. They will be enacted in partnership with Maritime Safety Queensland, Australian Maritime Safety Authority and Australian Hydrographic Office. They will be announced via public engagement, Notices to Mariners, through the VMR network, via radio broadcast on Marine VHF Channels and via signage at boat Ramps. They will be maintained via remote monitoring of AIS and in partnership Queensland Police Service-Water Police.

Temporary Restricted Areas will be established of the minimum extent and for the minimum time compatible with public safety. The restricted airspace will be approved by the Civil Aviation Safety Authority – Office of Airspace Regulation, following public and industry engagement via the Aviation State Engagement Forum. They will be assessed for safety impacts to the air traffic control system by Airservices Australia and are the subject of a Letter of Agreement between Gilmour Space and Airservices Australia that details the process for restricted airspace activation and deactivation. Restricted airspace will be announced via public engagement, by Notices to Airmen, by Airservices Australia air traffic controllers, via radio broadcast on local VHF Class G airspace frequencies and through the local aero-club networks. They will be maintained in partnership with Airservices Australia through remote monitoring.

In the context if the HRP, the EA report and subsequent reporting there are appropriate management and mitigation measures for potential risks, which demonstrates an ability to construct and operate the facility within the regulatory requirements and achieve compliance with certain standards.

Test Activity

Gilmour Space have prepared an Engine Test Hazard and Risk document refer to **Appendix 9**, which reviews characterises and quantifies the residual risks associated with the operation of the proposed test activity at the identified the BOS Launch Facility.

The review involves assessment of the systemic context, risk management processes, identified hazards, controls and treatment of residual risks including:

- nominal engine test; and
- engine test failure modes and effects.

This report does not assess routine personal occupational or workplace safety risks which instead are addressed within the relevant site safety plan.

The proposed engine test activities proposed are shorter, more focussed activities varying in length from a few days to several weeks. Engine tests may be performed as a part of a verification / qualification activity in support of a launch campaign or as a separate experimental or

developmental activity and a description of the proposed test activity is provided in Section 5 of this report.

Regulatory Authorities and Standards

Unlike the BOS launch activities, the proposed test activity is not assessed or regulated by the Australian Space Agency (ASA), as the activity is an industrial, research and development activity, requiring a land use planning approval and regulation.

Work Health and Safety Act

The Work Health and Safety Act 2011 (Qld) sets out requirements and standards for healthy and safe workplaces. It outlines what you must do to protect the health, safety and welfare of workers and other people in a place of work. It also puts legal obligations, or duties, on companies and their employees. The implementation of safety procedures around the conduct of test activity will be of critical importance.

In preparing this hazard and risk analysis, Gilmour Space conducted an assessment of the attendant risks of the launch and test operations of the spaceport facility in the context of the APSDA and recorded these results in a risk register. This assessment considered:

- *The local environment of the BOS facility.*
- *Engineering designs for the BOS facility.*
- *Environmental Assessment Report.*
- *International literature as published by organisations such as NASA, ECSS, IAASS.*
- *Test campaigns to be conducted at BOS.*

The category of risks considered were safety, technical, schedule, finance, environment (including cultural heritage), legal and reputation. This hazard and risk review will describe key risks to safety and the environment, including their treatment through controls and mitigations as well as the subsequent residual levels of risk when judged against the regulatory standards.

Risk and Control Analysis

The risk assessment for engine test at the BOS Launch Facility can be found in Appendix A to Engine Test Hazard and Risk document, refer to **Appendix 9**. This assessment identifies the residual risks from the operation of the proposed engine test activity. It is important to acknowledge that while all engineering effort is made in the design of test articles and supporting systems, the residual risk of failure during a test cannot be completed ruled out. As such, the locations for test pads have been chosen to minimise these risks to the public and the environment.

The review of the systems associated with the operation of the BOS engine test activity highlighted the key risk contexts below, which are considered in the analysis:

- Risks to personal safety on site.
- Risks to property and operations within the APSDA.
- Risk to the coastal environment within the BOS site.

Table 7.1.1 below highlights the hazards identified as related to activities associated with the BOS within the contexts to which they are applicable for this analysis.

Table 7.1.1 Test Activity Applicable Risk Contexts

	Applicable Risk Contexts		
Phase & Identified Hazard	**Personal Safety**	**APSDA**	**Coastal Env.**
Test Activities			√
Rocket Noise and Vibration	√	√	√
Exhaust Velocity and Thermal Effects	√		
Hazardous and Dangerous Goods	√	-	-
Catastrophic Failures	√	-	-

Untreated Hazards and Risks

Hazards generated by the conduct of the proposed engine test activity are generally related to:

- noise generation;
- exhaust plume that is both hot and high velocity;
- use of potentially hazardous substances and in the case of test failures;
- the generation of overpressure effects;
- thermal effects;
- debris fields; and
- loss of containment of hazardous substances.

Rocket Noise

As noted in Section 5 of this report rocket engine test generates significant noise from the combustion process and turbulent mixing of the exhaust flow with the surrounding air. There is a supersonic potential core of exhaust flow, surrounded by a mixing region. Noise is generated in this flow. It is directional, with the highest noise levels at an angle of 40 to 50 degrees from the direction of the exhaust flow.

Simpsons Engineering Group (SEG) conducted modelling engine types and planned testing frequencies and when comparing noise effects already studied within the previous development approval submission and the federally approved Public Environment Report, determined that the noise emissions from engine test activities "readily complies with existing site license conditions" (Bowen Orbital Spaceport – Engine Test Facilities, Simpson Engineering Group 4 Dec 2023).

Exhaust Velocity and Thermal Effects

The proposed test activity seek to demonstrate the capability of an engine to generate thrust through combustion and the generation of a reaction from high-speed exhaust. Exhaust plumes will exit the test articles with temperatures exceeding 1500°C and velocities exceeding 3 km/sec. Both dissipate within relatively short distances, however these temperatures and velocities represent physical hazards that carry the risk of direct physical damage to personnel or fauna and the risk of starting fires in any exposed vegetation or other combustible materials.

Hazardous and Dangerous Goods

The proposed test activity on the test pads includes the storage (during the test campaigns) and use of non-flammable compressed gasses, cryogenic fluids, combustible liquids, oxidising agents and industrial solvents. Hazardous goods carry the risk of personnel or fauna exposure and environmental contamination in both nominal use cases and in the event of a catastrophic failure described below.

Catastrophic Failure

Catastrophic failure of a proposed test rig or test article may result in the nearly instantaneous release of energy being generated or stored by the test. This energy release can manifest in many ways but the worst case involves generation of the following hazards:

- an overpressure blast wave (explosion);
- an expanding flame front (fireball);
- a debris field (fragmentation); and
- uncontained hazardous goods (contamination).

These hazards all represent risks to personnel, fauna and the environment in proximity to the activity, but there are control measures to manage the risks.

Controlling Risks

With every industrial activity, whilst all reasonable precaution will be taken in careful design and engineering of the articles to be tested, a reasonable probability of failure will accompany the proposed test activity and even nominal engine tests will generate risks. As such, controls will necessarily rely upon the exclusion of personnel and fauna from proximity of the proposed test activity, reasonable preparation of the surrounding area to prevent propagation of hazards in the

event of a failure and plans in place for response to any anomalous spills, fires or debris field generation.

Safety Zone Calculation Methodology

In order to calculate the safety exclusion zones, *the Defense Explosives Safety Regulation (DESR) 6055.09 Edition 1* developed by the US Department of Defense has been applied. This standard primarily covers explosive ordnance use within military applications, but also contains provisions for the application of the standard to liquid fuelled launch vehicles and engine test stands. *The result of the calculation process indicates two separation distances based upon the personnel involved:*

- *Essential Personnel distance which accounts for blast wave and thermal (expanding flame front) hazards and assumes the test operators are within a control area protected from fragmentation; and*
- *Non-Essential Personnel distance, which accounts for blast wave, thermal and fragmentation and is the safe distance at which all other site personnel may operate normal activities during an engine firing.*

The separation distances are unique to each engine design being tested, due to the varying fluid propellants, pressures and sizes, and the test stand design. These are then enacted for each test through the Range Safety Plan. The basic methodology applied from DESR 6055.09 follows:

1. *Determine the equivalent net explosive weight based upon the type of propellants, engine and size from VOLUME 5 – ENCLOSURE 4: ENERGETIC LIQUIDS.*
2. *Determine the thermal & blast wave separation distances for Essential and Non-Essential Personnel from VOLUME 5 – ENCLOSURE 3: AREAS USED FOR INTENTIONAL BURNS AND DETONATIONS.*
3. *Determine the fragmentation distance from VOLUME 3 – ENCLOSURE 3: QD CRITERIA FOR ACCIDENTAL DETONATIONS. Non-Essential Personnel distance is then the larger of 2 and 3.*

All blast wave and thermal separation distances are confined within the Lot 10 boundaries. Appropriate blast wall shielding with concrete link block walls and concrete barricades will be installed to confine all fragmentation distances to within the Lot 10 boundaries.

Uncontained hazardous chemical spills or contamination are mitigated through bunding around the test stand pad area compliant to the relevant Australian Standards (AS4326, AS1894, AS1940).

Test Operations and Range Safety

Range Safety at BOS incorporates functions to control and monitor heightened risk activity to maintain safety of employees and the public during proposed test campaigns. The Range Safety

Plan details the Range Safety Organisation and responsibilities, Range Design limitations and requirements, Range Operations processes, and the capabilities of the Local Response Team.

In preparation for proposed test activity, the Range Safety Team will sweep the hazard areas for each test to ensure they are clear of wildlife, inspect any bunding or containment measures in place to limit propagation of hazardous substances, conduct ground preparation (cutting long grass or wetting vegetation) and assume standby positions for response to any anomaly.

All test operations will be assessed through a Test Readiness Review that considers technical, operational procedures, logistic support, safety planning and emergency response aspects of the proposed test including review of a comprehensive risk assessment completed in line with the Gilmour Space Risk Management Policy and reviewed by the Workplace Health and Safety Officer. The review assigns specific roles to the test director and test conductor and ensures consultation with range safety and BOS operations staff has been completed.

Range safety carries two key responsibilities during the conduct of the proposed test activity:
Maintenance of the safety zones - through communication, physical barriers and surveillance of the required safety area, range safety will declare the range open – authorising the test activity to commence and, in the event of any safety zone likely or actual incursion, range safety will declare an abort. Range Safety will also deactivate the safety zones once the test hazards are confirmed to be retired.
Response to Anomaly - in the event of any anomaly, Range Safety will manage the BOS response including and Emergency Response Plan actions, containment, clean up and deactivation of the safety zones when satisfied the situation has been returned to nominal conditions.

Minor Change Assessment Table

The following table provides an assessment of the proposed test activity risk hazards and control measures in the context of the definition of 'minor change', as specified in Schedule 2 of the Act.

Minor Change Criteria	Comment
would not result in substantially different development	The proposed test activity from a risk hazards and control measures perspective, will not result in a substantially different development in the context of the BOS Launch Facility approval and associated risk and control measures.
the inclusion of prohibited development in the application	The proposed test activity, from a risk hazards and control measures perspective, will not result in the inclusion of prohibited development.
referral to a Referral Agency, other than the Chief Executive, if there were no Referral Agencies for the original development application;	The original application was referred to a number of advice agencies for comment.
referral to extra Referral Agencies, other than the Chief Executive;	The proposed test activity, from a risk hazards and control measures perspective, will not result in referral to extra referral agencies.

a Referral Agency to assess the application, or have regard to, any other matter other than matters that were assessed or regarded for the original application	The proposed test activity, from a risk hazards and control measures perspective, will not cause assessment against any other matter other than matters that were assessed or regarded for in the original application.
public notification if public notification was not required for the original development application	The original application was subject to public consultation, the OCG did not receive any submissions in relation to the BOS launch facility. Given the change proposed, it is not considered that the public consultation phase applies.

7.2 Hazardous and Dangerous Goods Management Plan

BOS Launch Facility and Test Activity

Gilmour Space prepared Hazardous and Dangerous Goods Management Plan (HDGMP), for the BOS Launch Facility, and the HDGMP has been updated to include the proposed test activity, refer to **Appendix 10**. The HDGMP establishes the framework used to transport, receive, storage, use, handle and dispose of hazardous and dangerous goods associated with the approved launch facility. The purpose of the HDGMP is to minimise the potential impacts on human health, property and the natural environment, whilst complying with the relevant legislative standards and codes.

The HDGMP identifies the relevant International Codes and Standards, Commonwealth and State Legislation and the applicable Australian Standards, which need to be complied with. It also sets out specific roles and responsibilities for employees and the training required for those employees and contractors who will be handling of hazardous goods.

Prior to working with hazardous substances, Gilmour Space complete a risk assessment in accordance the Gilmour Space's risk management procedure which follows a 5-step process of:

- Identifying the Risk – Identify hazards presented by project, task, or activity;
- Assessing the Risk – Qualify or quantify the consequence and likelihood;
- Making Risk Decisions – Determine controls or actions from hierarchy of controls;
- Implementing Controls – Assign ownership and timing to controls or actions; and
- Supervision – Risk acceptance and review.

The BOS Launch Facility (inclusive of the proposed test activity) has a hazardous substance register to monitor and manage hazardous substances when received, stored, used and potentially disposed of, to ensure effective receipt, handling and disposal. Hazardous substances will be stored in accordance with the relevant Australian Standards.

The BOS is a Manifest Quantity Workplace as defined in the *Work Health and Safety Regulation 2011* and notifies the regulator of its status via Form 73, displays placarding for all Schedule 11 chemicals on site and maintains SDS lockers for use by responding emergency services. Each chemical storage container complies with 4326, as does the storage compound.

Whilst not a Major Hazard Facility as defined in the *Work Health and Safety Regulation 2011*, the BOS does at times have holdings of Schedule 15 chemicals that exceed 10% of threshold quantities in the regulation and therefore needs to notify the regulator via form 69. Total Quantities of HTP will not normally exceed 60T (Schedule 15 threshold is 200T)

The hazardous and non-hazardous materials expected to be used during the operational phase of the BOS Launch Facility (inclusive of the proposed test activity) are shown below in tables below and overleaf.

Oxidiser Pad

Storage area	Dangerous Goods and Hazardous Chemicals					
	Name	**UN No.**	**Class**	**Sub risk/s**	**PG**	**Largest quantity**
HPT1001	*Hydrogen Peroxide, Aqueous solution, Stabilised*	*2015*	*5.1*	*8*	*I*	*20,000 L*
HPT1002	*Hydrogen Peroxide, Aqueous solution, Stabilised*	*2015*	*5.1*	*8*	*I*	*20,000 L*
HPT TX	*Hydrogen Peroxide, Aqueous solution, Stabilised*	*2015*	*5.1*	*8*	*I*	*20,000 L*

Cryogenic Pad

Storage area	Dangerous Goods and Hazardous Chemicals					
	Name	**UN No.**	**Class**	**Sub risk/s**	**PG**	**Largest quantity**
LOT1001	*Liquid Oxygen*	*1073*	*5.1, 2.2*	*2*	*n/a*	*4,500L VIE*
LNT1001A	*Liquid Nitrogen*	*1977*	*2.2*	*n/a*	*n/a*	*1,334Kg VIE*
LNT1001B	*Liquid Nitrogen*	*1977*	*2.2*	*n/a*	*n/a*	*1,334Kg VIE*

Fuel and Gas Pad

Storage area	Dangerous Goods and Hazardous Chemicals					
	Name	**UN No.**	**Class**	**Sub risk/s**	**PG**	**Largest quantity**
HEMP1001	*Helium*	*1046*	*2.2*	*n/a*	*n/a*	*337.5 SM3 (3 x 15 pack, G size)*

GNMP1001	*Nitrogen*	*1066*	*2.2*	*n/a*	*n/a*	*337.5SM3 (3 x 15 pack, G size)*
RPT1001	*Kerosene*	*1223*	*3*	*n/a*	*III*	*2,000L*
RPT1001	*Kerosene*	*1223*	*3*	*n/a*	*III*	*2,000L*
DT02	*Diesel*	*1202*	*3*	*n/a*	*III*	*4,000L*

Vehicle Assembly Building

Storage area	**Dangerous Goods and Hazardous Chemicals**					
	Name	**UN No.**	**Class**	**Sub risk/s**	**PG**	**Largest quantity**
DT02	*Diesel*	*1202*	*3*	*n/a*	*III*	*4,000L*
PAD	*Citrisurf*	*n/a*	*8*	*n/a*	*III*	*400L*
READY USE	*Smootharc Stainless Steel Pickling Gel*	*2922*	*8, 6.1*	*n/a*	*II*	*5kg*
READY USE	*Acetone*	*1090*	*3*	*n/a*	*II*	*1 L*
INTEGRATION BAY	*Helium*	*1046*	*2.2*	*n/a*	*n/a*	*E size*
INTEGRATION BAY	*Argon*	*1006*	*2.2*	*n/a*	*n/a*	*G size*

Test Pad 1 (HRE)

Storage area	**Dangerous Goods and Hazardous Chemicals**					
	Name	**UN No.**	**Class**	**Sub risk/s**	**PG**	**Largest quantity**
HTP ISO CONTAINER	*Hydrogen Peroxide, Aqueous solution, Stabilised*	*2015*	*5.1*	*8*	*I*	*20,000 L*
HTP REEFER TANK 1	*Hydrogen Peroxide, Aqueous solution, Stabilised*	*2015*	*5.1*	*8*	*I*	*2,000 L*
HTP REEFER TANK 2	*Hydrogen Peroxide, Aqueous solution, Stabilised*	*2015*	*5.1*	*8*	*I*	*2,000 L*
HTP REEFER TANK 3	*Hydrogen Peroxide, Aqueous solution, Stabilised*	*2015*	*5.1*	*8*	*I*	*2,000 L*
GENERATOR	*Diesel*	*1202*	*3*	*n/a*	*III*	*4,000L*
WORKSHOP	*Citrisurf*	*n/a*	*8*	*n/a*	*III*	*20L*

WORKSHOP	*Smootharc Stainless Steel Pickling Gel*	*2922*	*8, 6.1*	*n/a*	*II*	*5kg*
WORKSHOP	*Acetone*	*1090*	*3*	*n/a*	*II*	*1 L*
WORKSHOP	*Isopropyl Alcohol*	*1219*	*3*	*n/a*	*II*	*5 L*
GAS STORAGE	*Nitrogen*	*1006*	*2.2*	*n/a*	*n/a*	*12x Manpack (15x G size)*

Test Pad 2 (LRE)

Storage area	**Dangerous Goods and Hazardous Chemicals**					
	Name	**UN No.**	**Class**	**Sub risk/s**	**PG**	**Largest quantity**
LOX STORAGE TANK	*Liquid Oxygen*	*1073*	*5.1, 2.2*	*2*	*n/a*	*3000L VIE*
HTP STORAGE TANK	*Hydrogen Peroxide, Aqueous solution, Stabilised*	*2015*	*5.1*	*8*	*I*	*200 L*
GENERATOR	*Diesel*	*1202*	*3*	*n/a*	*III*	*2,000L*
GENERATOR	*D60 Solvent*	*CAS: 64742-48-9*	*n/a*	*n/a*	*n/a*	*1000L*
WORKSHOP	*Citrisurf*	*n/a*	*8*	*n/a*	*III*	*20L*
WORKSHOP	*Smootharc Stainless Steel Pickling Gel*	*2922*	*8, 6.1*	*n/a*	*II*	*5kg*
WORKSHOP	*Acetone*	*1090*	*3*	*n/a*	*II*	*1 L*
WORKSHOP	*Isopropyl Alcohol*	*1219*	*3*	*n/a*	*II*	*5 L*
GAS STORAGE	*Helium*	*1046*	*2.2*	*n/a*	*n/a*	*2x Manpack (12x G size)*
GAS STORAGE	*Nitrogen*	*1006*	*2.2*	*n/a*	*n/a*	*6x Manpack (15x G size)*

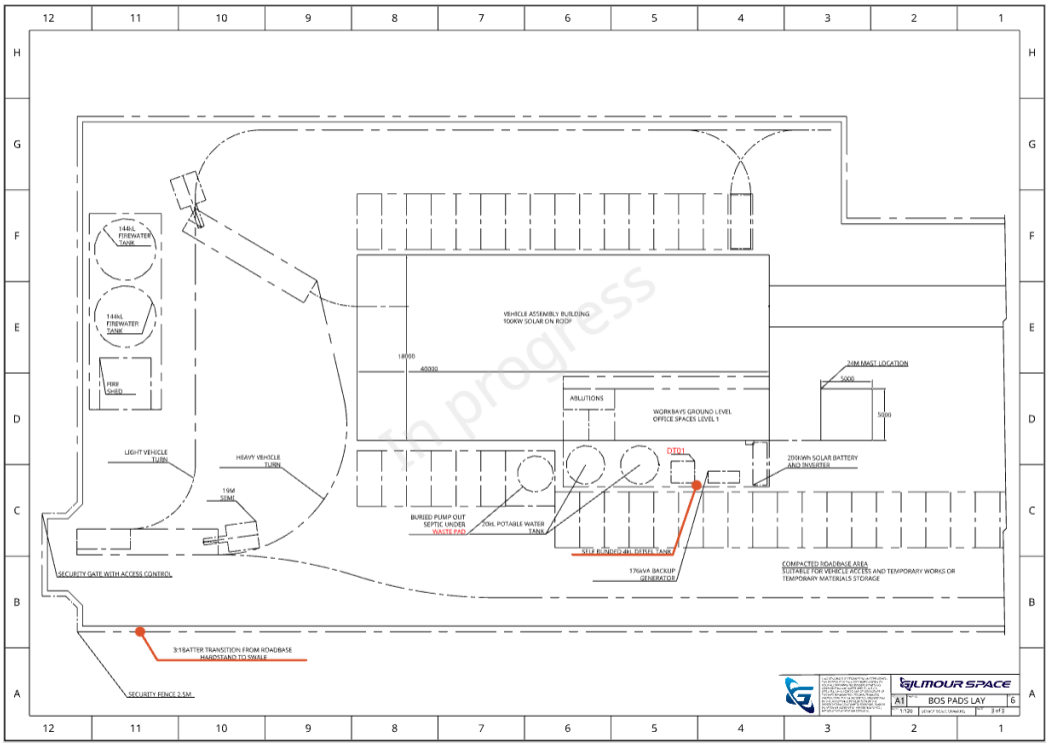


Figure 14 - Hazardous and Dangerous Goods Storage Areas Layout for VAB (Source: HDGMP prepared by Gilmour Space, refer to Appendix 10)

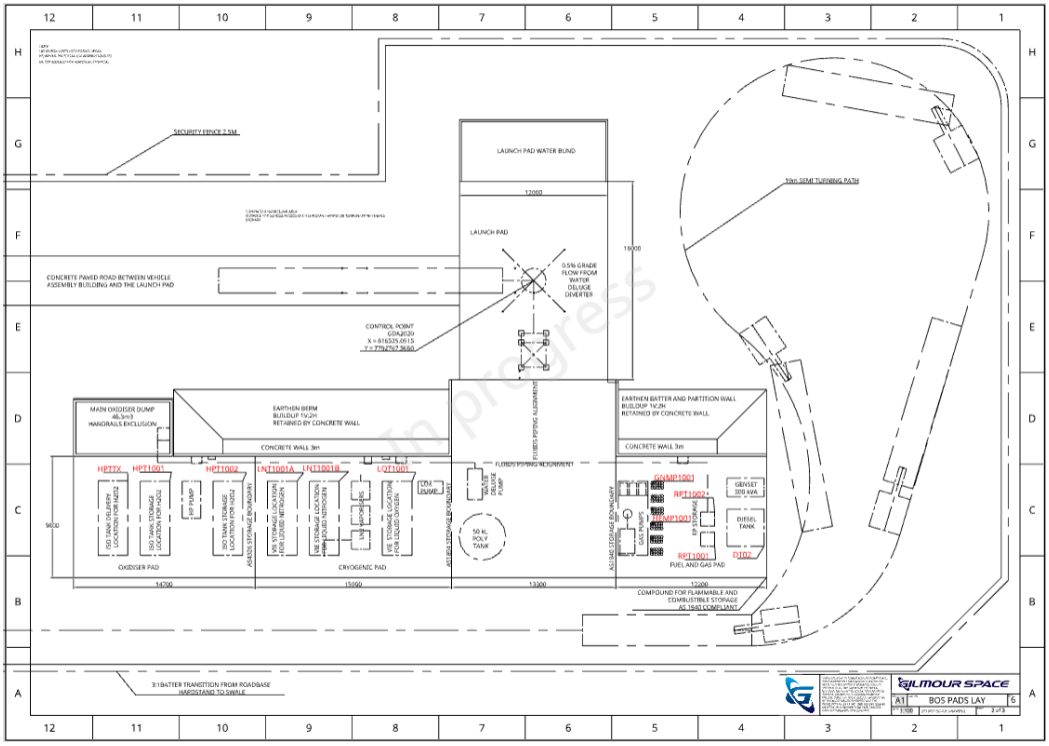


Figure 15 - Hazardous and Dangerous Goods Storage Areas Layout for Launch Pad and Storage Pads (Source: HDGMP prepared by Gilmour Space, refer to Appendix 10)

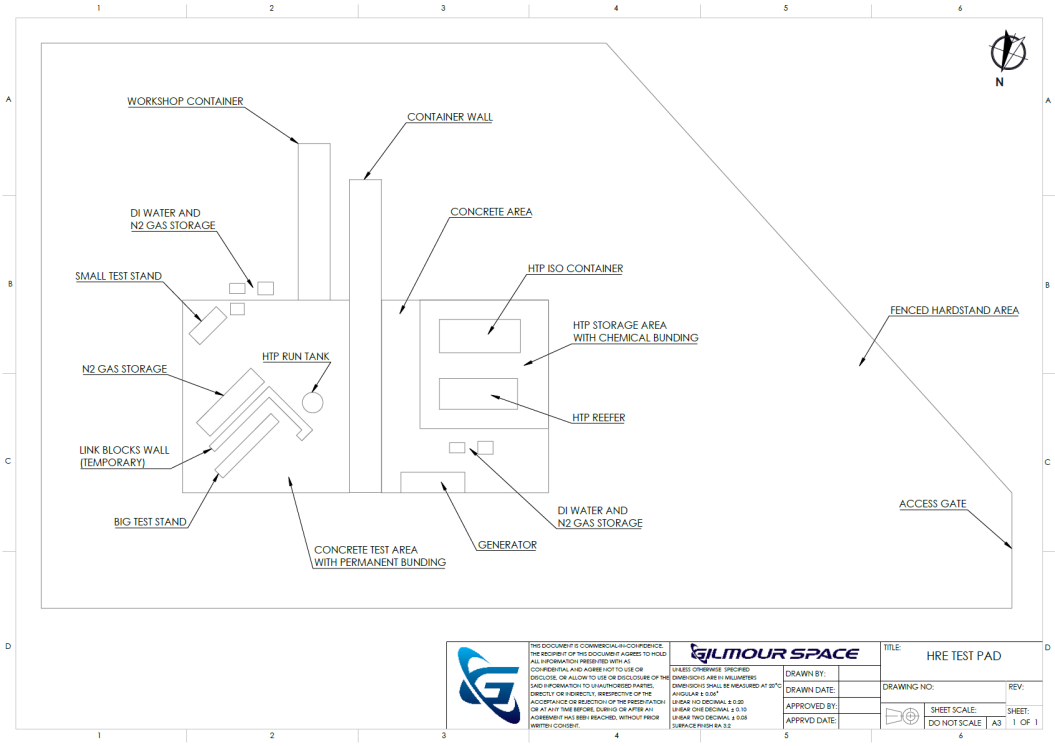


Figure 16 - HRE Test Pad Typical Layout (Source: HDGMP prepared by Gilmour Space, refer to Appendix 10)

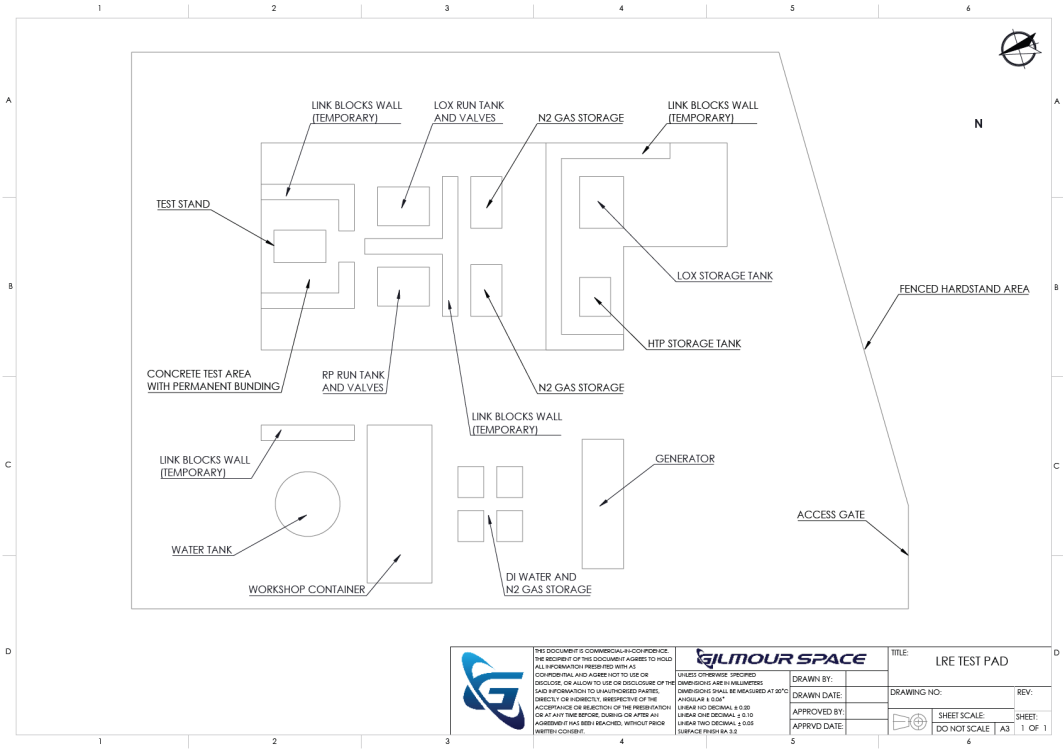


Figure 17 - LRE Test Pad Typical Layout (Source: HDGMP prepared by Gilmour Space, refer to Appendix 10)

All substances added to the hazardous substances register must also be accompanied with a corresponding SDS. Copies of SDSs must be maintained at the placed in the front of each of the 3 physical SDS folders stored at the BOS Launch Facility. Storage facilities shall comply with the managing risks of hazardous chemicals in the workplace code of practice 2021. Hazardous substances are labelled in accordance with the labelling of workplace hazardous chemicals code of practice 2021 published by Workplace Health and Safety Queensland.

In terms of fire protection, the BOS Launch Facility maintains fire extinguishers of suitable types and quantities at locations where the risk of fire is present. The selection and location of fire extinguishers is consistent with AS/NZS 2444:2001 Portable Fire Extinguishers and Fire Blankets. Requirements of AS/NZS 1940:2017 Storage and Handling of Flammable and Combustible Liquids and AS/NZS 4326:2008 Storage and Handling of Oxidisers relating to fire safety is observed. Specialist systems are available for the potential for experimental battery fires within the launch vehicle body (N2 / CO2 flood systems) when launch vehicles are being assembled.

All waste or unused hazardous substances will be removed from site in line with legislative and code of practice requirements, as well as the BOS Waste Management Plan. Details of any disposal or removal of waste or unused hazardous substances shall be approved by the Site Operations Supervisor prior to disposal or removal. All documentation or removal is kept Hazardous Waste Register in accordance with the Gilmour Space Document Management Policy.

7.3 Emergency Response

Gilmour Space have prepared an Emergency Management Plan (EMP), refer to **Appendix 11**, the purpose of which is to inform the actions and responses of BOS Launch Facility staff and launch customers in the event of an incident / accident or other emergency.

EMP includes the following:

- Descriptions of emergency policy, preparedness, and structures;
- Lists of significant hazards and resources;
- Emergency Coordination Group activation triggers and process;
- Evacuation procedures;
- Response measures for domestic emergencies;
- A supplement for launch related emergencies; and
- Requirements for testing, training, reporting, and record keeping related to this plan.

<u>BOS Emergency Management Philosophy</u>

The BOS Launch Facility is a unique capability by virtue of the risks associated with operation of an orbital class launch vehicle, but it has similar characteristics to many other work environments with high value equipment, critical infrastructure, hazardous chemicals, and processes interacting

with employees and the general public. Hazards can be influenced by a range of circumstances and can arise from extreme weather, natural disasters, medical emergencies and the democratic right to protest. The local and regional emergency services are expected to lead BOS staff and visitors in any response to any emergency – domestic or launch.

A response structure, informed by detailed understanding of the hazards and capabilities of staff within the BOS will be established and there will standard checklists that can be modified to suit the circumstances encountered in each specific event.

BOS Emergency Management Response Support

Staff will receive regular training, with mock emergency scenarios to test the EMP and response structures, with the reporting from the mock testing informing regular review of the and improvement. These tests may include participation from local emergency services

All staff at the BOS (employees, contractors, and launch customer representatives) and all BOS visitors must undergo induction training as a condition of entry to the site. This induction will include at a minimum, introduction to the hazards present at the BOS, emergency evacuation assembly points, and emergency signals and notifications at the BOS. A summary of this induction is to be issued with all ID / Visitor passes for the BOS in the form of a single card aide memoir.

All staff (employees, contractors, and launch customer representatives) who are resident for work purposes at the BOS Launch Facility for a period of more than 20 days per annum will be familiar with the EMP and their general duties in the event of an emergency. Staff with explicit safety or emergency response duties will receive additional role specific training to familiarise themselves with the EMP and gain a clear understanding of their personal roles and responsibilities in support of the plan.

The EMP is relevant to the BOS Launch Facility (inclusive of the proposed test activity) and the Launch Control Centre (LCC).

Emergency Assembly Areas

There are four nominated Emergency Assembly Areas (EAA) in the EMP as illustrated on Figure 16 below. EAAs are designated locations for staff to meet during an evacuation and a location for responsible Gilmour Space staff to meet with local emergency services who are responding to an incident.

Figure 16 - BOS Layout and EAAs Overview (Source EMP prepared by Gilmour Space, refer to Appendix 11)

The EMP includes a guide for dealing with the most likely hazardous chemicals at the BOS Launch Facility. If access to or from the BOS or LCC is restricted for an extended period, resilience stores have been provided at each location (LCC and VAB). Should the isolation be extended by flood or similar interruption to trunk infrastructure, alternate transport will be sought by Gilmour Space (via air or sea).

The Vehicle Assembly Building (VAB)

The VAB is an industrial building that houses industrial machinery including lifting and pressure apparatus, hazardous chemicals storage and fall hazards. The VAB is furnished with PPE and medical stores, spill response kits, firefighting equipment and resilience stores. The VAB may house the Emergency Control Group in certain circumstances. The VAB will usually accommodate 2-4 personnel but during launch campaigns this will increase to 40 personnel during peak use periods. VAB significant hazards and response capabilities are depicted in Figure 17 overleaf.

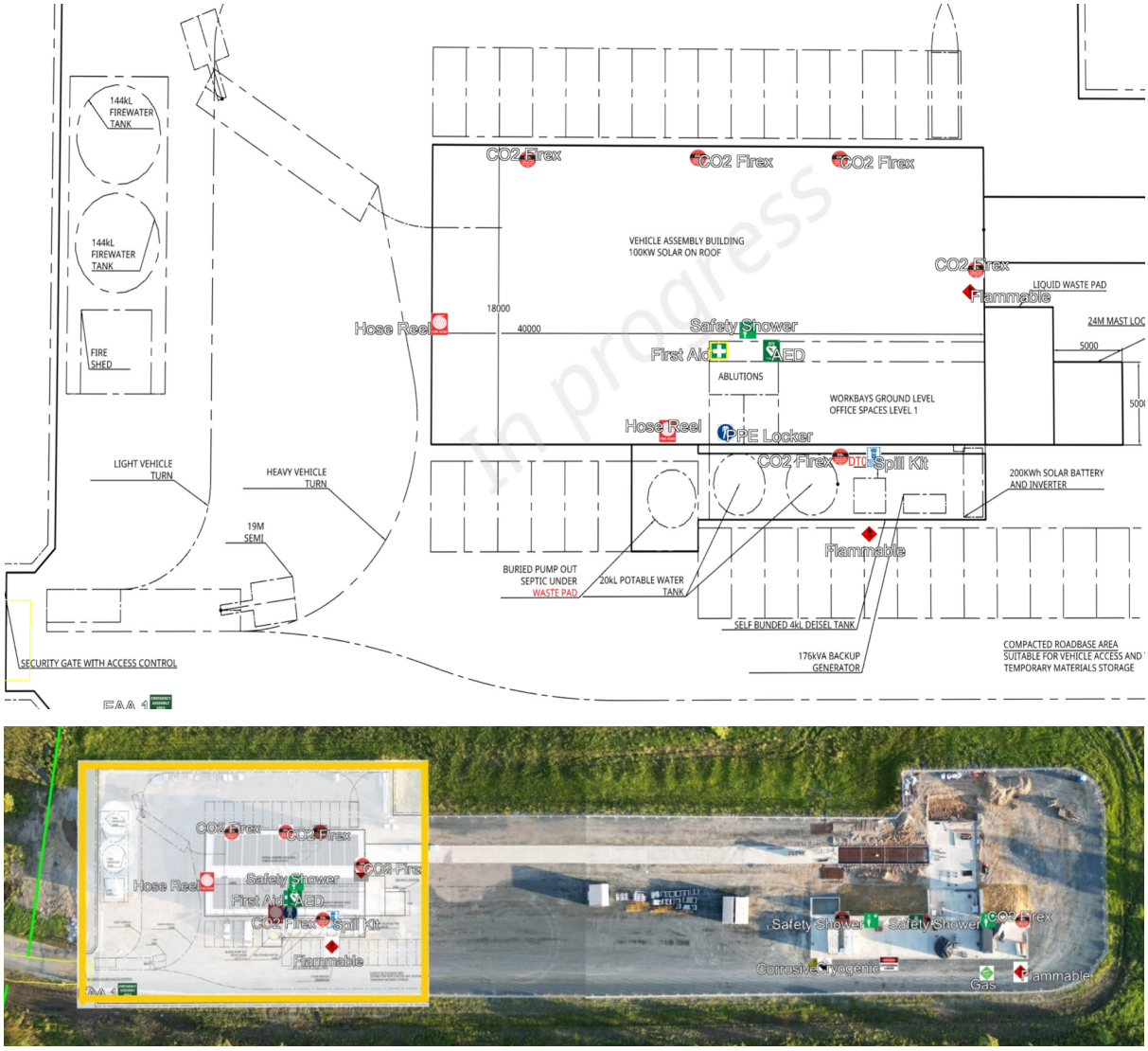
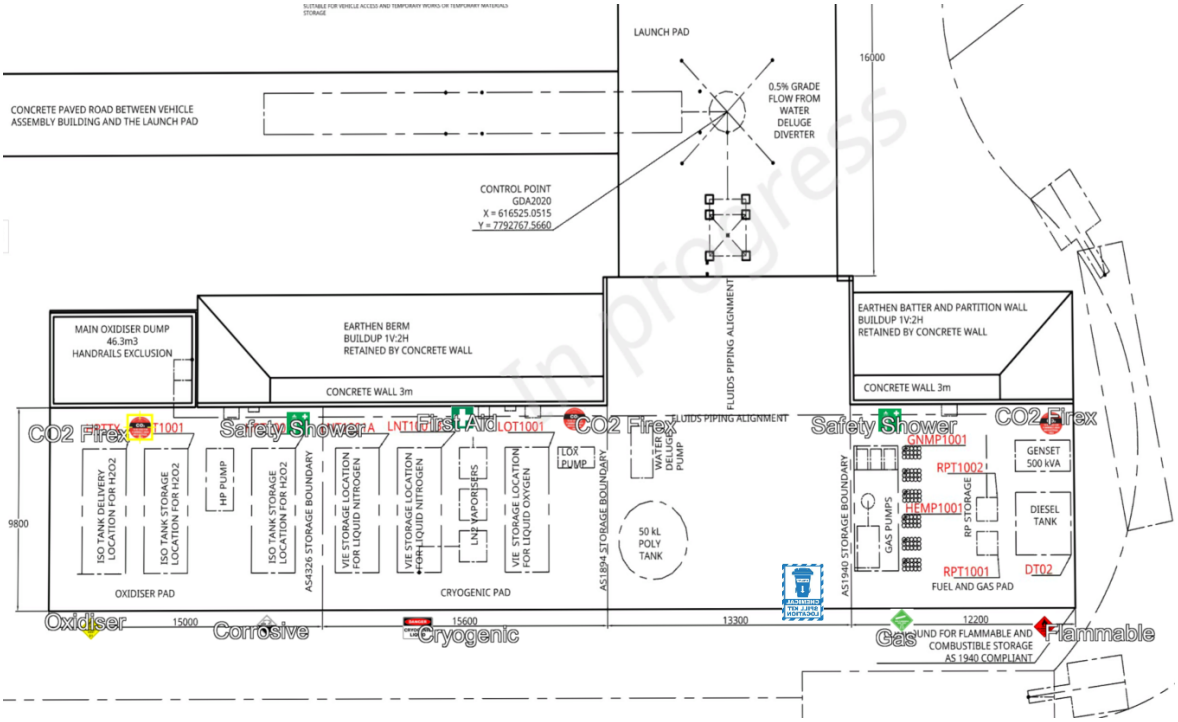


Figure 17 - PAD Hazards and Resources (Source EMP prepared by Gilmour Space, refer to Appendix 11)

The Launch Pad (PAD)

The PAD is situated north of the VAB and consists of a set of self-bunded concrete pads for the raising of the launch vehicle and storage of launch gasses and fluids. The PAD houses industrial machinery, high-pressure piping, and a significant quantity of hazardous chemicals. The PAD is furnished with holdings of PPE, spill response kits, firefighting equipment, resilience stores and emergency shutdown controls. PAD significant hazards and response capabilities are depicted in Figure 18 overleaf.



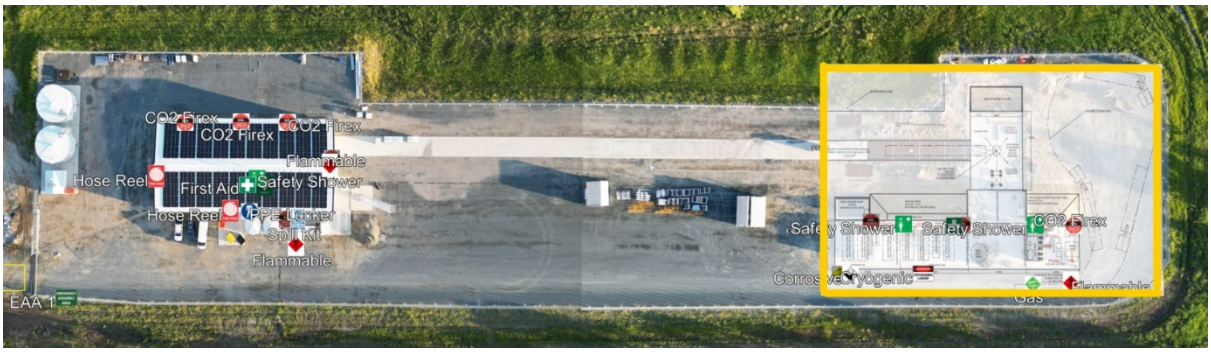


Figure 18 - PAD Hazards and Resources (Source EMP prepared by Gilmour Space, refer to Appendix 11)

Test and Verification Pads

The two small, remote test and verification pads are accessed via the Lot 10 fire trail. The hazards present on these pads will vary with the test activity as will the response capabilities.

Test pad 1 provides a venue for Hybrid Rocket Engine (HRE) test activity. The 15 m x 30 m pad is contained within a fenced yard and hosts a permanently embedded thrust structure and can be further configured through the placement of link blocks and containers to protect and host oxidiser tanks and support equipment.

Test pad 2 provides a venue for Liquid Rocket Engine (LRE) test activity. The pad is contained within a fenced yard and is configured through the placement of link blocks to protect and host fuel and oxidiser tanks, a thrust structure and support equipment.

The Launch Control Centre (LCC)

The LCC is located within North Queensland Bulk Ports (NQBP) facilities approximately 6 km from the PAD. It is a self-contained set of demountable structures housing administrative and information technology suites. The LCC is furnished with medical stores and firefighting equipment.

BOS Communications Equipment

The BOS Launch Facility communication system will leverage, satellite broadband, fibre optic broadband, dark fibre, RF and wi-fi to provide connectivity between sites and staff.

BOS Emergency Warning System

The BOS Launch Facility is fitted with a visual and aural warning system (Cygnus Wireless) that will be sounded in the event of an emergency requiring staff action and awareness. The system will use two distinct warning modes displaying coloured amber or red strobe lights sounding different (120dB) tones.

BOS Local Response Team (LRT)

BOS Launch Facility will have a local response capability during all hazardous activities. The intent of the Local Response Team (LRT) is to provide a limited, immediate response to any fire, spill or injury on site in order to variously:

- preclude the need for external emergency services support;
- stabilise the situation until external emergency services arrive; and
- or control the scene to prevent access by personnel or equipment until control can be restored.

The LRT has equipment to allow it to:

- extinguish small fires, or protect small assets from fire;
- contain or dilute small chemical spills;
- render first aid (applicable to hazards that exist at BOS); and
- secure or cordon off danger areas.

Select members of the BOS team will be capable of forming part of the LRT. To ensure they can safely respond to requirements their training and assessment program will be expanded to include:

- Basic Wildfire response training;
- Advanced First Aid training; and

- Spill Management training.

The LRT will conduct continuation training at least monthly to ensure currency in role.

Emergency Control

Upon becoming aware of a situation potentially requiring a central response the EC will consider the activation status of the BOS. In accordance with the Queensland Disaster Management Arrangements, levels of activations for disaster coordination centres are broken into four phases, Alert, Lean Forward, Stand Up and Stand Down. The movement of disaster/emergency groups through these phases is not necessarily sequential. It is based on flexibility and adaptability to the location and event.

The EMP contains a series of checklists for different emergency scenarios.

Minor Change Assessment Table

The following table provides an assessment of the proposed test activity hazard and dangerous goods management (storage/ handling/ disposal) and emergency response procedures/ management in the context of the definition of 'minor change', as specified in Schedule 2 of the Act.

Minor Change Criteria	**Comment**
would not result in substantially different development	The proposed test activity, in the context of hazard and dangerous goods management (storage/ handling/ disposal) and emergency response procedures/ management will align with those associated with the approved BOS Launch Facility. As such the proposed test activity, will not result in a substantially different development in the context of the BOS Launch Facility approval, and the
the inclusion of prohibited development in the application	The proposed test activity, in the context of hazard and dangerous goods management (storage/ handling/ disposal) and emergency response procedures/ management, will not result in the inclusion of prohibited development.
referral to a Referral Agency, other than the Chief Executive, if there were no Referral Agencies for the original development application;	The original application was referred to a number of advice agencies for comment.
referral to extra Referral Agencies, other than the Chief Executive;	The proposed test activity, in the context of hazard and dangerous goods management (storage/ handling/ disposal) and emergency response procedures/ management will align with those associated with the approved BOS Launch Facility, meaning the change will not result in referral to extra referral agencies.
a Referral Agency to assess the application, or have regard to, any other matter other than matters that were assessed or regarded for the original application	The proposed test activity, in the context of hazard and dangerous goods management (storage/ handling/ disposal) and emergency response procedures/ management will align with those associated with the approved BOS Launch Facility. The change will not cause assessment against any

	other matter other than matters that were assessed or regarded for in the original application.
public notification if public notification was not required for the original development application	The original application was subject to public consultation, the OCG did not receive any submissions in relation to the BOS launch facility. Given the change proposed, it is not considered that the public consultation phase applies.

7.4 Security Plan

Gilmour Space have prepared a Security Plan to detail the procedures and policies to be followed in order to protect the BOS Launch Facility and proposed test activity from physical and cyber threats of intrusion, theft and malicious interference, refer to **Appendix 12**.

The Security Plan includes:

- The security strategy for the BOS;
- A description of the BOS facilities and security design features;
- A list of security roles and responsibilities;
- ACTIVE Facility security procedures;
- IDLE Facility security procedures; and
- Security reporting and governance requirements.

The BOS Launch Facility will pursue a two-tiered security posture acknowledging different levels of risk dependent upon whether the facility is ACTIVE or IDLE.

<u>BOS Facility and Test Pad Security</u>

The BOS Launch Facility and test pads are protected from public access by the NQBP Abbot Point Security gate. The VAB and Launch Pad (PAD) are contained within the perimeter of a security fenced compound with an access controlled security gate. The VAB and PAD are fitted with motion sensing CCTV Surveillance of the interior and exterior of the building, intrusion resistant physical locks, a security alarm system and an internal intrusion resistant security room.

The LCC is located within the NQBP Eastern Laydown Area that is enclosed with security fencing and controlled access tracks. The LCC is fitted with motion sensing CCTV surveillance of the facility, intrusion resistant physical locks, and a security alarm system.

Test Pads 1 & 2 are located adjacent to the BOS Launch Facility fire trail. The test pads exist for the isolated conduct of engine and propulsive component test and verification activity. Each pad is contained within a designated fenced area and incorporates a raised hardstand, vehicle access ramp and thrust structure. Each is configurable to support a variety of tests.

Visitors are strictly limited to the facility and must be facilitated through the NQBP Gate before being met at the BOS or LCC access gates.

Staff are to be vigilant when entering or leaving secure areas so that they do not facilitate access by unauthorised personnel or vehicles. To ensure this outcome staff should ensure that secure area doors or gates close fully behind them. This includes the security compound gate at the VAB when entering and leaving.

Gilmour Space has a no imagery sharing policy in terms of staff, and networks external to Gilmour Space. Visitors and contractors on arrival are reminded of the requirement to refrain from capturing images or video of the site and its infrastructure.

Visitors or contractors at the BOS may (as detailed above) under supervision, retain electronic devices where necessary and may be granted wireless access to the GST Guests network.

Each member of the BOS staff has a role to play in managing the security of the BOS and must be aware of the contents of this document and their general obligations to protect Gilmour people, assets, and knowledge.

Minor Change Assessment Table

The following table provides an assessment of the proposed test activity and security in the context of the definition of 'minor change', as specified in Schedule 2 of the Act.

Minor Change Criteria	**Comment**
would not result in substantially different development	The proposed test activity, in the context of the Security Plan, will not result in a substantially different development in the context of the BOS Launch Facility approval.
the inclusion of prohibited development in the application	The proposed test activity, in the context of the Security Plan, will not result in the inclusion of prohibited development.
referral to a Referral Agency, other than the Chief Executive, if there were no Referral Agencies for the original development application;	The original application was referred to a number of advice agencies for comment.
referral to extra Referral Agencies, other than the Chief Executive;	The proposed test activity, in the context of the Security Plan, will not result in referral to extra referral agencies.
a Referral Agency to assess the application, or have regard to, any other matter other than matters that were assessed or regarded for the original application	The proposed test activity, in the context of the Security Plan, will not cause assessment against any other matter other than matters that were assessed or regarded for in the original application.
public notification if public notification was not required for the original development application	The original application was subject to public consultation, the OCG did not receive any submissions in relation to the BOS launch facility. Given the change proposed, it is not considered that the public consultation phase applies.

8.0 CULTURAL HERITAGE

8.1 Cultural Heritage Act 2003

The *Aboriginal Cultural Heritage Act 2003* (Cth) binds all persons, including the State, and is intended to provide effective recognition, protection, and conservation of Aboriginal Cultural Heritage.

8.2 Launch Facility and Cultural Heritage

Gilmour Space through the BOS project proudly acknowledges and celebrates the First Peoples of Australia and their ongoing strength in upholding some of the world's oldest living cultures. Gilmour Space acknowledge the Traditional Owners of the lands throughout what is now Australia, where we live and work, and pay our respects to their Elders, past, present and emerging.

Gilmour Space has and will continue to engage and communicate with Kyburra Munda Yalga Aboriginal Corporation RNTBC (Kyburra), the Registered Native Title Body Corporate for the Juru people, the Traditional Owners of the land and waters around Abbot Point.

A formal consultation process with Kyburra relative to the Gilmour Space development project commenced in July 2021. Gilmour Space personnel met with Kyburra Munda Yalga directions on 28 August 2021 and agreed to the conduct of a site reconnaissance visit on 8 October 2021, with the intent to progress to a full Cultural Heritage Survey and voluntary Cultural Heritage Management Agreement thereafter.

In addition to meeting, the duty of care requirements pursuant to the *Aboriginal Cultural Heritage Act*, Gilmour Space remains committed to engaging and working closely with the Aboriginal Corporation to achieve positive outcomes on some broader aspirations.

The EMP prepared by Gilmour Space, refer to **Appendix 6**, includes the existing Cultural Heritage Management Agreement, the proposed test activity will cause any changes the existing agreement.

9.0 FURTHER LICENCES AND PERMITS

9.1 Australian Space Agency

BOS Launch Facility

Alongside the regulatory authority or town planning approvals, in Australia is the Australian Space Agency (ASA), is the regulatory authority for space activities. This agency is responsible for issuing of launch facility licences and launch permits for the safe launching and returning of space objects. The requirements that must be satisfied for a Facility Licence or launch permit to be issued are detailed in the Space (Launches and Returns Act) 2018 (SPLARA).

The SPLARA aims to hold all private commercial and government space activities to a high standard of integrity and to ensure public safety, economic and environmental values are met. There are several regulations, codes and procedures that support the SPLARA, and these are summarised below:

- **Space (Launches and Returns) Act 2018**
  - Launch Facility Licensing.
  - Launch Permit Approval.
  - Environmental Approval Requirements.
  - Insurance Requirements.
- **Space (Launches and Returns) (General) Rules 2019**
  - Steps out the process for applications involving space launch.
  - Requires scrutiny of engineering and trajectory by Minister appointed suitable qualified expert.
- **Space (Launches and Returns) (High Power Rocket) Rules 2019**
  - Steps out process for applications involving sub orbital high powered rockets.
- **Space (Launches and Returns) (Insurance) Rules 2019**
  - Steps out the process to be used for determining insured amounts.
- **Flight Safety Code**
  - Describes the tools and techniques for numerically determining residual risk of launch to the public and property.
- **Maximum Probable Loss Methodology**
  - Steps out the methodology and process of determining a worst-case scenario for insurances.

The intent of oversight from the ASA in relation to the Act is to determine whether the intended activity complies with the relevant federal legislation and regulation.

9.2 Future Approvals

BOS Launch Facility

A project of this nature will require approvals/ licences/ permits under other regulatory legislative provisions to enable the BOS launch facility to establish on site and become operational, with some of these approvals/ licences/ permits required per launch campaign. **Table 9.2** below outlines the future approvals that will be required, along with the applicable legislative framework, the regulatory authority and timing associated with obtaining the required approvals.

Table 9.2 – Further Approvals

Approvals/ licences/ permits	Legislative framework	Regulatory authority	Timing for approval to be obtained	Once off approval or per campaign
Launch Facility Licence	Space Act 2018	ASA	Obtained	Once off
Launch Permit	Space Act 2018	ASA	Obtained for the first launch	Per Campaign
Airspace Change Proposal	Civil Aviation Act 1988 Airspace Act 2007	CASA	Awaiting Approval	Per Campaign

Given the future approvals that will be required, and the activities associated with launch campaigns and in particular launch day, Gilmour Space and have continued active engagement with the following stakeholders:

- Australian Space Agency (ASA);
- Civil Aviation Safety Authority (CASA);
- Airservices Australia (AsA);
- Australian Maritime Safety Authority (AMSA);
- Maritime Safety Queensland (MSQ);
- Queensland Fire Services (QFS); and
- Queensland Police Services (QPS).

It is further noted that an independent Launch Safety Office will be allocated to each launch campaign.

Test Activity

The proposed test activity is an industrial/ research and technology use, requiring assessment by the nominated Assessment Manager, which is the OCG.

Minor Change Assessment Table

The following table provides an assessment of the proposed test activity and further permits/ approvals/ licences in the context of the definition of 'minor change', as specified in Schedule 2 of the Act.

Minor Change Criteria	**Comment**
would not result in substantially different development	The proposed test activity, from an approval's perspective, is considered an activity that is ancillary to the primary/ core use of the BOS Launch Facility, which is launch campaigns and launching rockets. As a consequence, the proposed change sought will not result in a substantially different development in the context of the BOS Launch Facility approval.
the inclusion of prohibited development in the application	The proposed test activity, from an approval's perspective, will not result in the inclusion of prohibited development.
referral to a Referral Agency, other than the Chief Executive, if there were no Referral Agencies for the original development application;	The original application was referred to a number of advice agencies for comment.
referral to extra Referral Agencies, other than the Chief Executive;	The proposed test activity, from an approval's perspective, will not result in referral to extra referral agencies.
a Referral Agency to assess the application, or have regard to, any other matter other than matters that were assessed or regarded for the original application	The proposed test activity, from an approval's perspective, will not cause assessment against any other matter other than matters that were assessed or regarded for in the original application.
public notification if public notification was not required for the original development application	The original application was subject to public consultation, the OCG did not receive any submissions in relation to the BOS launch facility. Given the change proposed, it is not considered that the public consultation phase applies.

10.0 RELEVANT LEGISLATION

10.1 Commonwealth Legislation

The project was referred to the Department of Agriculture, Water and Environment (DAWE), under the *EBPC Act,* for a controlled action determination. The required EPBC Approval has been issued by DAWE, and it is not considered that the proposed change requires further assessment by DAWE, due to the nature of the proposed test activity.

10.2 State Development and Public Works Organisation Act 1971

The *State Development and Public Works Organisation Act 1971* (SDPWOA) regulates development within State Development Areas (SDA). Under s 79 of the SDPWOA, all SDAs require a development scheme which overrides local government and State government planning instruments.

Part 3 of the *State Development and Public Works Organisation (State Development Areas) Regulation 2009* declares the APSDA Development Scheme as being the relevant instrument for the assessment of development within the APSDA.

10.3 Development Scheme and Assessment Manager

In accordance with the provisions of the APSDA Development Scheme, the proposed development constitutes a Change Application (Minor) to SDA Development Approval APC2002/007 - Material Change of Use – High Impact Industry (Launch Facility), for which the Coordinator-General is the applicable assessment

10.4 Potential State Interests and Referral Entities

Pursuant to Schedule 2, Part 2 of the APSDA Development Scheme, the Coordinator-General identified and nominated the referral entities relevant to the original BOS Launch Facility development application following lodgement.

Ordinarily a change application (Minor) will not require formal referral to Whitsunday Regional Council, DAF, DES, Department of Transport and Main Roads or NQBP. For the purposes of this change application (minor), we have included Table 10.4, which formed part of the original BOS Launch Facility Development Application, and which nominated the applicable State Interest Referral Triggers. An additional column has been added to the table to confirm if the referral triggers apply to the test activity.

Notwithstanding, this change application the State referral mapping nominates the following State interests as relevant to the subject site:

- Coastal management district (CMD);
- Coastal area - erosion prone area (EPA);
- Coastal area - medium storm tide inundation are;
- Coastal area - high storm tide inundation area;
- Queensland waterways for waterway barrier works (QWWBW);
- Wetland protection area trigger area (WPTA);
- Wetland protection area wetland (WPAW); and
- Regulated vegetation management map (Category A and B extract) (Vegetation Clearing).

Table 10.4 State interests Referral Triggers (the *Planning Regulation 2017*)

State Interest	**Assessable Development**	**Referral Trigger**	**State Development Code**	**Referral Entity Triggered - BOS Launch Facility**	**Referral Entity Triggered – Test Activity**
Schedule 10, Part 17, Division 3, Table 6 – Work in a Coastal Management District	Material Change of Use/ OPW	Development application for a material change of use that is assessable development under a local categorising instrument, if carrying out the change of use will involve— (a) operational work that— (i) is carried out completely or partly in an erosion prone area in a coastal management district; and (ii) is extracting, excavating or filling 1,000m^3 or more, or clearing native vegetation from an area of 1,000m^2 or more; or (b) building work, carried out completely or partly in an erosion prone area in a coastal management	8	Yes	No - earthworks will not exceed 1,000 m^3 and clearing native vegetation will not exceed 1,000 m^3

		district, if the building work involves increasing the gross floor area on the premises by 1,000m^2 or more			
Schedule 10, Part 6, Division 4, Subdivision 3, Table 1 - QWWBW	Operational Work	Operational work that is constructing or raising waterway barrier works is assessable development, unless the work is accepted development under schedule 7, part 3, section 6	18	No - the proposed waterway barrier works will be designed to align with the provisions of the accepted development code for Waterway Barrier Works	No – there are no mapped waterways in the vicinity of the test pads
Schedule 10, Part 6, Division 4, Subdivision 3, Table 1 - Wetland and Wetland Protection Area	Material Change of Use	Development application for a material change of use that is assessable development under a local categorising instrument, other than a material change of use relating to a domestic housing activity, government supported transport infrastructure or electricity operating works, If— (a) all or part of the premises are in a wetland protection area; and (b) the material change of use involves operational work that is high impact earthworks in a wetland protection area	9	Potentially	No – there is a satisfactory separation distance between the test pads and the Wetland and Wetland Protection Area
Schedule 10, Part 3, Division 4, Table 2 - Clearing Vegetation	Material Change of Use/ OPW	Development application for a material change of use that is assessable development under a local categorising instrument and relates to a lot that is 5ha or larger, if—	16	No – Clearing would fall under an exemption – urban	No – as per the response for the BOS Launch Facility

		(a) the application— (i) is for a preliminary approval that includes a variation request; and (ii) relates to a lot that contains native vegetation shown on the regulated vegetation management map as a category A area or category B area; and (iii) is for a material change of use, other than a non-referable material change of use; or (b the application is not stated in paragraph (a) and all of the following apply- (i) the material change of use does not involve prescribed clearing; (ii) accepted operational work may be carried out because of the material change of use, or the material change of use involves operational work that is assessable development under section 5; (iii) the accepted operational work or assessable operational work includes development other than the clearing of regulated regrowth vegetation on freehold land, indigenous land, or land the subject of a		purpose in an urban zone – the zoning within the planning scheme is Industrial Investigation Zone – which is considered to be Urban Zone for the purposes of the *Planning Regulation* and the *Vegetation Management Act.*	

		lease given under the Land Act for agriculture or grazing purposes			
Schedule 10, Part 9, Division 4, Subdivision 1, Table 1 – Aspect of development stated in Schedule 20	Material Change of Use	Development application for an aspect of development stated in schedule 20 that is assessable development under a local categorising instrument or section 21, if— (a) the development is for a purpose stated in schedule 20, column 1 for the aspect; and (b) the development meets or exceeds the threshold— (i) for development in local government area 1—stated in schedule 20, column 2 for the purpose; or (ii) for development in local government area 2—stated in schedule 20, column 3 for the purpose; and (c) for development in local government area 1—the development is not for an accommodation activity or an office at premises wholly or partly in the excluded area However, if the development is for a combination of purposes stated in the same item of schedule 20, the threshold is for the combination of purposes and not for each individual purpose.	6	Yes	No – the test activity will not result in development listed in Schedule 20 of the *Planning Regulation*
Schedule 10, Part 9, Division 4, Subdivision 1, Table 1 –	Material Change of Use	Development application for a material change of use that is assessable development under section 13, unless the	21	Yes	No – given the nature of the

Aspect of development stated in Schedule 20		chief executive is the prescribed assessment manager			proposed change

10.5 State Planning Policy

The subject site triggers the following State interests of the State Planning Policy (refer **Appendix 4**):

- Agriculture – Important agricultural area and agricultural land classification – class A and B.
- Development and construction – State development area.
- Biodiversity – MSES – Wildlife Habitat (endangered or vulnerable).
- Biodiversity – MSES – Wildlife Habitat (special least concern animal).
- Biodiversity – MSES – Regulated Vegetation (category R).
- Biodiversity – MSES – Regulated vegetation (intersecting a watercourse).
- Biodiversity – MSES – High ecological significance wetlands.
- Coastal Environment – Coastal management district.
- Natural hazards risk and resilience – Flood hazard area – Level 1.
- Natural hazards risk and resilience – Local Government Flood Mapping Area.
- Natural hazards risk and resilience – Bushfire prone area.
- Natural hazards risk and resilience – Erosion prone area.
- Natural hazards risk and resilience – Medium storm tide inundation area.
- Natural hazards risk and resilience – High storm tide inundation area.
- Strategic ports – Strategic ports.

The proposed change application (minor) does not trigger referral or assessment against the SDAP or SPP.

10.6 Mackay, Isaac and Whitsunday Regional Plan

The Mackay, Isaac and Whitsunday Regional Plan (MIWRP) was implemented in February 2012, and it establishes a vision and direction for the region to 2031. It provides certainty about where the region is heading and provides a framework to respond to challenges and opportunities that may arise.

The regional plan identifies the regional framework and desired regional outcomes for the Mackay, Isaac and Whitsunday region (the region) and these regional outcomes have been reflected in the State Planning Policy July 2017 and the Whitsunday Regional Council Planning Scheme 2017.

The proposed change development is considered to be consistent with the desired regional outcomes principles and policies of the MIWRP, given the site of the BOS launch facility is identified as being within the Urban Footprint and the economic and social benefits associated with it for the region and potentially further afield.

10.7 Sustainable Ports Development Act 2015

The Port of Abbot Point is nominated as a Priority Port under Part 2 of the Sustainable Ports Development Act 2015. In accordance with Ports Act requirements, master planning for the priority Port of Abbot Point has commenced, with a notice of proposal issued to the relevant port authority and local government on 5 May 2021.

Preliminary master planning processes are currently underway to support the preparation of a draft master plan and port overlay that will be released for public consultation. The proposed test activity will coexist with the approved BOS Launch Facility, which is located in proximity to the Port of Abbot Point. In terms of future master planning for the Port of Abbot Point, given the nature of the proposed change and operations associated the BOS Launch Facility and test activity, it is not considered the inclusion of test activities at the facility that will compromise future master planning or actual development within the Port of Abbot Point. Industries that contribute to the region's economy and economic growth, evolve and change overtime, noting the recent growth within the space industry.

11.0 ASSESSMENT

11.1 Minor Change Criteria

The changes requested within this correspondence are considered to accord with the legislative definitions of a 'minor change', as specified in Schedule 2 of the Act, as the change to the development approval:

(i) would not result in substantially different development; and

(ii) if a development application for the development (including the change) were made at the time this change application is made, it would not cause:

(A) the inclusion of prohibited development in the application;

(B) referral to a Referral Agency, other than the Chief Executive, if there were no Referral Agencies for the original development application;

(C) referral to extra Referral Agencies, other than the Chief Executive;

(D) a Referral Agency to assess the application, or have regard to, any other matter other than matters that were assessed or regarded for the original application; or

(E) public notification if public notification was not required for the original development application.

11.2 Assessment Against Minor Change Criteria

Section's 5, 6, 7 and 9 of this change application (minor) include a series of Minor Change Assessment Tables to demonstrates that various components and matters associated test activity comply with Schedule 2 of the Act and (i) and (ii) referenced above.

The proposed change clearly complies with item (ii) given the nature of the proposed change which does not introduce any new components that would be prohibited, result in additional referral assessment, or introduce the requirement for public notification.

The proposed change complies with item (i) as it does not result in substantially different development, as prescribed by Schedule 1 of the Development Assessment Rules, given:

- the change does not involve a new use as engine testing is approved as part of the BOS Launch Facility;
- the change does not result in the application applying to a new parcel of land;
- the change does not dramatically change the intended built form in terms of scale, bulk, and appearance in the context of the development as a whole;
- the change does not affect the ability of the development to operate as intended, given the test activity is ancillary to the primary use activity, which is launch campaigns and launch activities;

- the change does not remove a component of the development that is integral to its operation, given the change relates to text activity which is critical for the verification and development of the rocket engines;
- the proposed change does not result in an increase in employee numbers at the facility than originally approved;
- the change does not result in significant impacts to traffic flow and the transport network;
- the change does not introduce new impacts or increase the severity of known impacts associated with noise, vibration, air emissions, environmental values, hazard and risk, control measures and security;
- the change does not remove an incentive or offset component that would have balanced a negative impact of the development; or
- the change does not impact on the provision of infrastructure.

In addition, the development inclusive of the proposed change remains consistent with the relevant assessment benchmarks as originally approved (Abbot Point SDA Development Scheme State Codes and Whitsunday Regional Council Planning Scheme), refer to **Appendix 13**.

11.3 Condition Amendments

Condition 1 will need to be updated to reflect the proposed change which is illustrated on the following plans:

- LRE Launch Pad Earthworks Plan - 21-307-C00 Rev A;
- SIRIUS Launch Pad Earthworks Plan – 21-307-C01 Rev 1;
- SIRIUS Test Pad Slab Plan – 21-307-S130 Rev 1;
- SIRIUS Test Pad Concrete Details – 21-307-S131 Rev A;
- SIRIUS Test Pad Slab Plan – 21-307-S140 Rev A; and
- SIRIUS Test Pad Concrete Details Plan – 21-307-C00 Rev A.

11.4 Affected Entities

As outlined in Section 10.4, pursuant to Schedule 2, Part 2.1, Item 4 of the TSDA Development Scheme, the Coordinator-General will identify and nominate the referral agencies relevant to the application following lodgement. As noted in Table 10.4, it is not necessary for the Coordinator-General to refer the change application to either Council or any other Stakeholders or Agencies, given the nature of the change and associated activities and operations does not trigger referral in the context of the Planning Regulation 2017.

12.0 CONCLUSION AND RECOMMENDATION

12.1 Assessment Summary

The assessment of the proposed change to the approved development against the criteria relevant to the change application (minor) supports a recommendation for approval based on the following reasons:

- the proposed change is consistent with the criteria defining a minor change;
- the proposed change does not result in substantially different development;
- the development inclusive of the proposed change remains consistent with the relevant assessment benchmarks as originally approved; and
- compliance with the assessment benchmarks can be managed through reasonable and relevant amended conditions.

12.2 Recommendation

Given the above facts and circumstances presented in this change application (minor), we recommend that the Coordinator General **approve** the proposed change subject to the amended conditions outlined in this report.