Special Use Airspace Proposal

Enabling development flight operations

at the Tāwhaki National Aerospace Centre

Version – A

20 February 2025

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1 Introduction

1.1 Background

Aerospace development in Aotearoa is growing rapidly, and both the advanced aviation and space sectors have numerous innovators looking to develop their technologies to enable a range of benefits. With this increase in novel aircraft, rocket and system testing, the need for special use airspace (SUA) is clear and essential to ensure airspace safety levels are maintained or ideally, increased.

Tāwhaki has worked closely with both innovators, the University of Canterbury (UC), the CAA and the wider airspace community to determine a proposal which aims to address this need. Tāwhaki is proposing a flexible and fit-for-purpose approach to SUA that supports airspace activity at the Tāwhaki National Aerospace Centre (TNAC) and around Kaitorete more broadly.

Section 2 provides an overview of the proposal; more detailed information is available from Section 3 onwards.

1.2 Updated Proposal

As part of the SUA Proposal development process, Tāwhaki worked closely with the airspace community to ensure the proposal was fit-for-purpose and minimised the effect of its operation as much as possible.

Prior to submitting this proposal to the CAA, an earlier version of this document was provided to stakeholders, and several responses were gratefully received (see Section 7 for details).

This revised document contains the updated SUA Proposal which includes these comments.

2 Proposal Summary

2.1 Overview

The proposal is for the establishment of permanent Special Use Airspace (SUA) at the Tāwhaki National Aerospace Centre. The Tāwhaki SUA proposal provides a managed approach to ensuring safety levels are maintained or increased in an area of increasing flight activity including R&D flight testing and will undergo periodic reviews to ensure its effectiveness.

Table 1 provides an overview of proposal, alongside the images in Section 2.2.

	Restricted Areas	Danger Areas	Additional Notes
Location	Kaitorete and offshore over the Canterbury Bight		
Identifiers	R1, R2, R3, R4, R5, R6	D1, D2, D3, D4, D5, D6	D1 – D5 boundary is the same as for the Dawn temporary SUA application
Administering Authority	Tāwhaki	N/A	Danger Areas accessed via Restricted Areas
Using Agency	N/A	No single Using Agency	Point of contact and activity details included in NOTAM
Effective Period	Permanent Designation, Charted on VNC		Not permanently activated
Activation	NOTAM, 24-hrs in advance		Tāwhaki to originate NOTAM for both RA and DA
Size of SUA Activated	Only required SUA areas activated for a given operation i.e. smallest area possible		CAA to authorise Test Operators' use of DA.
Anticipate Frequency of Activation	~Weekly	~Monthly	Test campaigns can come in groups/batches of flights
Activation Period	Operator Specific		Procedures in place to enable Airspace Users to transit active RA.
Altitudes: Lower Levels	All RA: Surface	D2, D5, D6: Surface D1, D3, D4: 6,000ft	D1, D3, D4, sit directly on top of R1, R2, R3, R4, R6
Altitudes: Upper Levels	R1, R2, R3, R4, R6: 6,000ft R5: 3,500ft	All DA: FL999	Altitudes specified in NOTAM. RA activations nominally below CTA.
Communications	VHF Radio		Contact details included in NOTAM
Activity Types	Advanced Aviation Emerging Technology Ground-based Systems	Advanced Aviation Emerging Technology Ground-based Systems Rockets	
Effect on Air Traffic	Minimised. *Ref. Section 6.2*	Minimised. *Ref. Section 6.1*	SUA Concept of Operation described in *Section 5.5*

Table 1 - Tāwhaki SUA Key Information

2.2 Visuals of Proposed Tāwhaki SUA

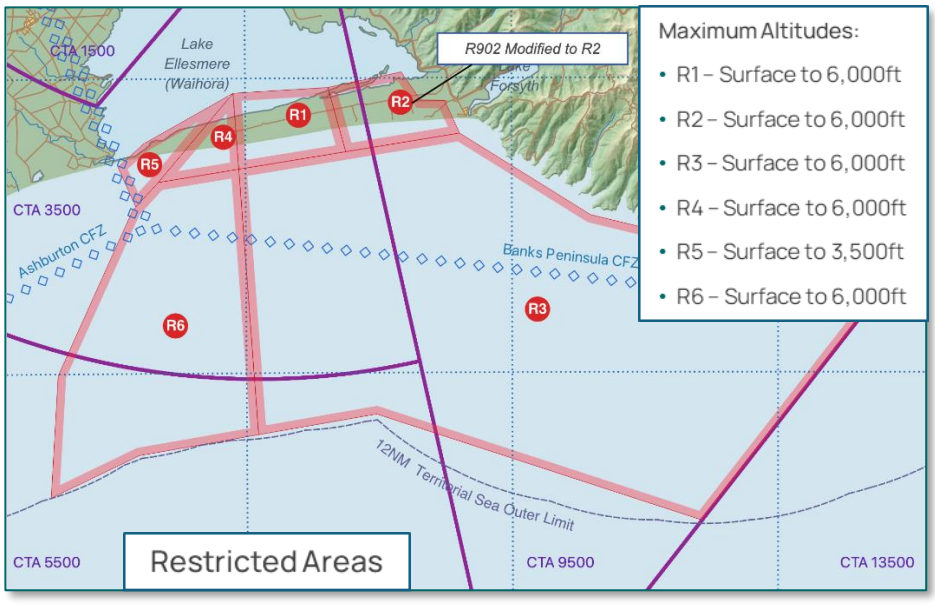

Figure 1 – Proposed Restricted Areas

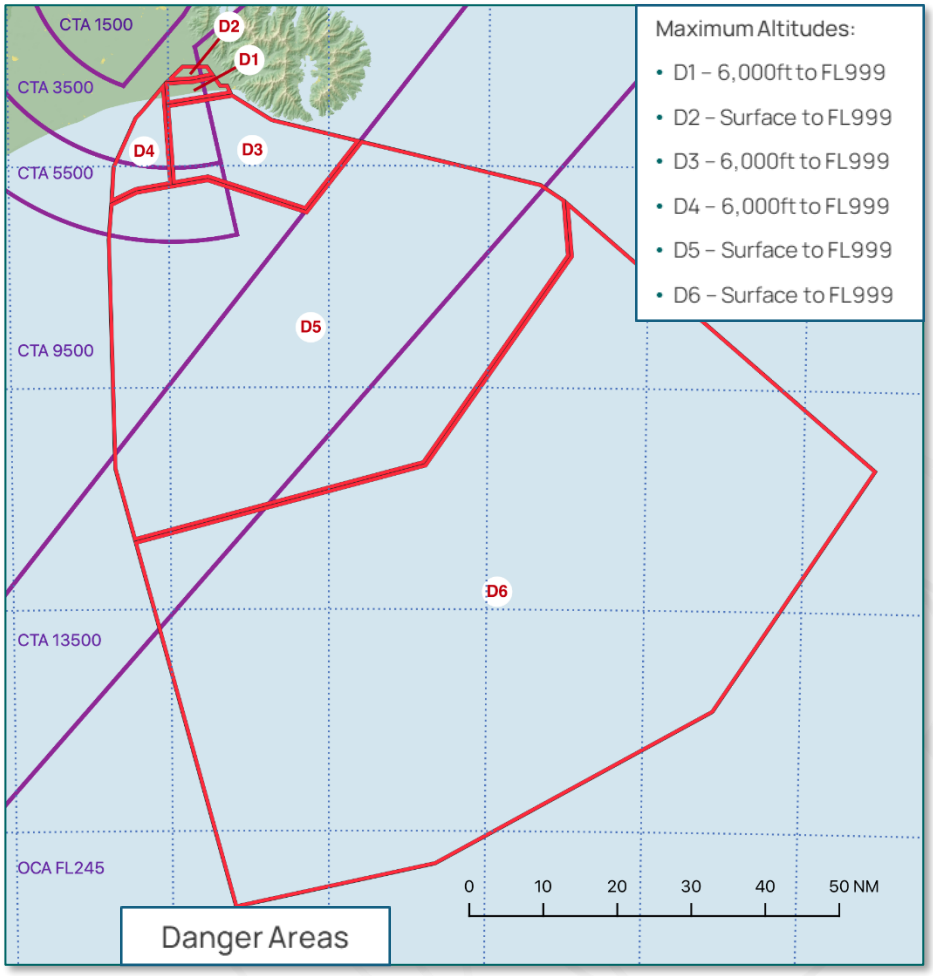

Figure 2 – Proposed Danger Areas

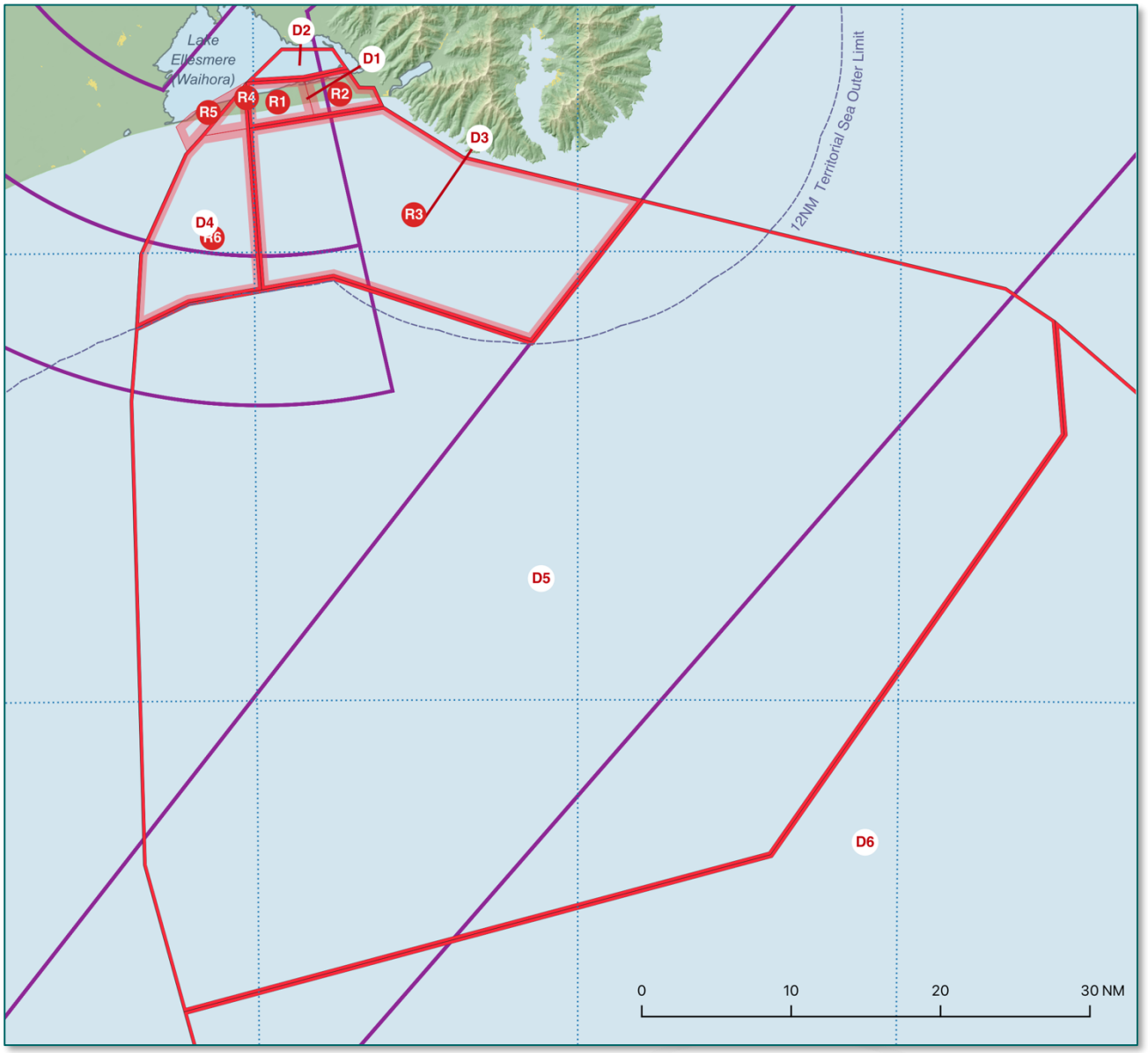

Figure 3 – Proposed Special Use Airspace (RA and DA) Nearest Shore

2.3 Additional Information

i. The Tāwhaki SUA is designed to:

- be enduring and enable both near & long-term test and evaluation (T&E) activities, such as:
  - advanced aviation, emerging technologies and ground-based systems R&D,
  - rocket launch (e.g. sounding rockets).
- minimise impact to existing airspace users:
  - SUA is only activated as required, i.e. permanently charted but not permanently active.
  - Several SUA areas designated to enable individual activation – as small as practicable.
  - Boundaries align with known operational areas e.g. Canterbury Aero Club (CAC).
  - Procedures established to enable Airspace Users to transit the RA when active.
  - Test Operations including associated safety buffers are wholly contained within the Tāwhaki SUA boundaries.
- include new Restricted Areas (RA) and Danger Areas (DA):
  - Six RA proposed over Kaitorete & to the 12nm territorial limits of New Zealand (Figure 1)
    - R902 integrated into new RA
  - Six DA proposed over both Te Waihora and beyond the 12nm territorial limits of New Zealand (Figure 2)
    - D1 – D5 boundary is the same as for the Dawn temporary SUA application
    - D6 extends to ~110nm offshore

ii. Tāwhaki would be the Administering Authority of the Restricted Areas:

- Providing a centralised and coordinated approach to airspace activities at Kaitorete.
- Primary means of communication will be via Very High Frequency (VHF) radio.
- Tāwhaki will coordinate airspace entry to-, operation in-, and exit from- the RA.
  - Airspace User pre-approval to transit the RA obtained via Tāwhaki Airspace User Briefings.
- Access to the DA is via the RA.

iii. No single Using Agency designated for Danger Areas, instead:

- Test Operators will only be able to use the DA once authorised by the CAA.
- The following activity information shall be included in the Notice to Airmen (NOTAM):
  - Person or organisation responsible for the activity taking place in the DA.
  - Type of activity taking place in the DA.

iv. Activation of the Tāwhaki SUA is done via NOTAM:

- NOTAM includes activation altitude for each of the Tāwhaki SUA.
- Activated to the lowest altitude necessary for a test activity.
- For RA activations only:
  - Nominal operating altitudes expected below CTA e.g. ~2,500ft.
- For DA activations:
  - R1, R2, R3, R4 & R6 activated to 6,000ft to enable Test Operators access to the DA.
  - D1, D3 & D4 activated from 6,000ft to altitude Test Operators altitude approved by CAA.
  - D2, D5 & D6 activated from Surface to altitude Test Operators altitude approved by CAA.
- Activation status communicated via broadcast message on loop, on a dedicated VHF frequency.

v. Designation by the 24th April 2025 is targeted to meet AIP charting timelines.

3 Background to Tāwhaki

3.1 Establishment

Tāwhaki is a unique partnership between Kaitorete mana whenua – Te Taumutu Rūnanga and Wairewa Rūnanga – and the Crown. Tāwhaki was established on 26th May 2021 to advance the aerospace sector in Aotearoa and heal and rejuvenate Kaitorete. It owns 1,000 hectares of whenua at Kaitorete, an area with rich cultural history and many taonga and threatened flora and fauna species. Tāwhaki is weaving together mātauranga Māori and cutting-edge innovation in aerospace and environmental rejuvenation for our region, country and planet.

3.2 Tāwhaki National Aerospace Centre

The Tāwhaki National Aerospace Centre ("TNAC") was established in early 2022 and formally opened on the 9th February 2024 following the completion of a 1km-long, 30m-wide sealed runway.

The site is recognised as one of the world's best locations for aerospace. It is globally unique both geographically and culturally. It sits on land that is expansive, unpopulated, bordered by lake and sea with low surrounding air and sea traffic and favourable space launch angles, just an hour's drive from a modern city with international transport links. It also supports both the aspirations of the aerospace sector and indigenous people.

Figure 4 – Tāwhaki National Aerospace Centre

The TNAC is a multi-use facility that Tāwhaki is scaling up gradually in line with demand, with hangar and office facilities shortly to be completed. Options for renewable energy on-site and vertical launch are also being explored. Tāwhaki provides innovators with the infrastructure, environment and technical assistance to safely test, evaluate and operate their novel aerospace aircraft, systems and technologies. Having this capability in Aotearoa helps foster the onshore growth of exciting local aerospace companies and attract international business. To date Tāwhaki has supported both local and international operators including Kea Aerospace, Dawn Aerospace, Wisk, Envico Technologies, Aerosearch and the University of Canterbury.

3.3 Unique role of Tāwhaki in supporting aerospace sector

Tāwhaki is uniquely placed to support the growth of the New Zealand aerospace sector due to its mandate and capabilities. By providing a safe and supportive environment for testing, developing and operating a wide range of new technologies, regulators and agencies in Aotearoa and around the world can gather data and insights to assist development of airspaces that are fit for the future.

4 Reason for Application

4.1 Sector Demand

4.1.1 Maintaining and increasing safety in an area of increased R&D flight activity

Aerospace in Aotearoa is growing rapidly. Both the advanced aviation and space sectors have numerous innovators looking to develop their technologies to enable their benefits to be realised.

Tāwhaki has worked with several innovators at all stages of the development cycle, from early start-ups to mature aerospace multi-nationals. There is also significant interest for both domestic and international innovators to use the Centre. With the exponential growth of technology and its inclusion in aerospace applications, the need for safe locations to enable test and evaluation is essential.

4.1.2 Recent SUA Applications

Over the past two years, the Centre has seen a diverse range of aircraft flight test activities. Several operators have required special use airspace (SUA) to be designated by the CAA; other operators have also been advised SUA will likely be required for their test activities.

The current approach of designating SUAs specific to each operator creates complexity in the airspace at Kaitorete without necessarily improving safety outcomes. The workload and cost associated with the application process, both to innovators, the CAA and wider airspace community alike, is also significant.

4.1.3 Feedback from Previous SUA Applications

During recent SUA applications for Kaitorete, there have been several calls for a more permanent SUA solution to be established. With increasing aviation research and development (R&D) activity, a permanent SUA would improve safety and efficiency outcomes for all airspace users by:

- enabling the SUA to be included on the Aeronautical Information Publication (AIP) charts
- providing a central point of contact for SUA activation
- minimising the repeated application extensions and associated burden for all involved with the process.

4.2 Diversity of Activity

To date, innovators at the Centre have included small-scale drone activities below 400ft, high-altitude platforms (up to FL999), and uncrewed aircraft operations in controlled airspace to name a few. This diversity in aircraft types and concepts of operation have quite different needs for SUA. A flexible and robust approach is required.

To ensure the smallest effect on other airspace users, the proposal has been designed with this flexibility in mind from the outset: The lateral size of area to be activated, the altitude the areas is to be activated to, and the duration of activation can all be tailored. This is supported with clear procedures and lines of communication.

4.3 Air Traffic Control Separation with Uncrewed Aircraft

Air Traffic Control (ATC) standards currently separate aircraft based on their Visual Flight Rules (VFR) or Instrument Flight Rules (IFR) capability. Accordingly, ATC do not have criteria to separate other traffic from

uncrewed aircraft (UA) which are not yet considered VFR or IFR capable. ATC can, however, separate controlled flights from SUA.

To enable ATC separation, unless other protocols are in place, UA operations will be contained entirely within the active SUA. ATC are thus able to separate other aircraft from test flights by separating other aircraft from the active SUA.

4.4 Increased Situational Awareness

Restricted areas (RA) are requested to enable certain UA to operate in segregated airspace. RA would be used to enable UA to make R&D flights which are not yet capable of avoiding or co-operating with other air traffic.

Danger areas (DA) are requested to enable ATC to separate other traffic from UA in controlled airspace.

The DA extend into uncontrolled airspace to ensure that VFR traffic operating without a radio or ADS-B OUT are aware of UA operations.

4.5 Broader Sector and Public Interest

In September 2024, the Government agreed to a set of actions to support and grow the advanced aviation industry in New Zealand, while maintaining current levels of safety.

The changes are intended to be implemented by the end of 2025 and ensure the system is efficient, easier to navigate and allows for rapid iteration and testing of advanced aviation vehicles and technologies. Supporting the growth of advanced aviation, which Tāwhaki was set up to help deliver, also serves the broader public interest via the economic benefits of high-tech, high wage job creation and the utilisation of new aerospace technologies in emergency management, environmental monitoring, precision agriculture, sustainable transport, connecting communities and advancing science for our people and planet.

The agreed government-led actions include the establishment of multiple physical areas for certificate holders under what's termed as a light touch regulatory approach – a new 'Civil Aviation Rule' – to conduct their experimental or developmental operations freely.

Establishing permanent Special Use Airspace at Kaitorete would provide a first test case of this concept by creating a safe environment for experimental or developmental operations activities to take place. The proposal has been discussed with the Ministry of Transport (MoT), and it will provide vital insights on the ideal frameworks for establishing further successful testing 'sandboxes' around Aotearoa.

5 Permanent Special Use Airspace Proposal

5.1 Aim of Proposal

This proposal aims to provide a managed approach to ensuring safety levels are maintained or increased in an area of increasing R&D flight testing. The following is covered within this proposal:

- permanent SUA which provides for current and future aerospace development activities
- a central point of contact for all aerospace activities taking place from the TNAC
- assurance the effect of the SUA is minimised on airspace users
- clarity of the roles and responsibilities associated to the SUA
- clarity on procedures surrounding the activation, entry to-, operation within- and exit from the RA.

Tāwhaki has worked closely with innovators, the University of Canterbury (UC), the CAA and the wider airspace community to determine a proposal that addresses the need described in Section 4 without adversely impacting existing airspace users. Tāwhaki sought and considered stakeholder responses to ensure the most appropriate, flexible and enduring solution can be realised.

The objective is to complete this process commensurate with the AIP charting cycle for November 2025.

5.2 Proposed Tāwhaki SUA Design

This proposal is for the establishment of permanent SUA at the Tāwhaki National Aerospace Centre.

The SUA is to be permanently designated but not permanently activated.

Tāwhaki propose a coordinated set of six restricted areas close to the coast, overlaid with six danger areas which extend from part of Te Waihora (Lake Ellesmere) over Kaitorete Spit to larger areas well offshore in what is otherwise little used airspace, collectively referred to as the 'Tāwhaki SUA'.

The boundaries of the Tāwhaki SUA areas have been selected to maximise the ability to share the use of airspace and minimise the impact on existing aviation activity.

The Tāwhaki SUA would be activated only to the extent necessary for the activity. Dividing the airspace into segments in this way allows the greatest amount of airspace to remain unaffected at any one time, and hence available for all airspace users as normal.

The Tāwhaki SUA has been designed to support current and future aerospace development and emerging technology applications, including but not limited to uncrewed aircraft activities (over a wide range of sizes and capabilities), rocket launches and ground-based systems.

5.2.1 Restricted Areas

Six Restricted Areas are requested. Four divide the airspace along Kaitorete (R1, R2, R4, R5), and another two offshore extend to just within the 12NM Territorial Limit (R3 & R6).

In conjunction with UC, the existing restricted area R902 is integrated into this proposal. R902 evolves into R2. As a result, the designation of R902 will be lifted when the RA in this proposal are designated.

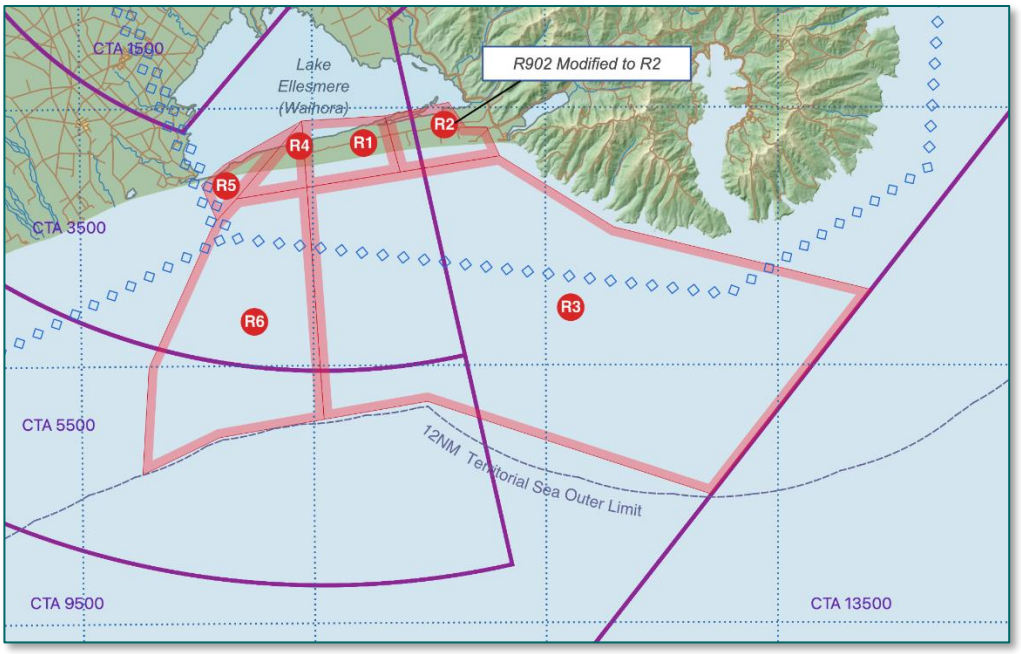

Figure 5 - Proposed Tāwhaki Restricted Areas

Areas R1 and R2, are aligned with areas traditionally used by Canterbury Aero Club (CAC). Tāwhaki and CAC currently have a Memorandum of Understanding (MoU) in place, and both will work collaboratively to coordinate RA activation and update the MoU to ensure equitable use of airspace.

To ensure the simplest airspace design, each RA (except R5) has a maximum activation altitude of 6,000ft to provide a consistent upper level for the DA to sit atop.

R5 is designate to enable stewardship of the land using of aerospace technologies. A maximum altitude of 3,500ft is proposed to avoid any effects on overhead flight routes in the CTA.

RA	R1	R2	R3	R4	R5	R6
Lower Level	Surface	Surface	Surface	Surface	Surface	Surface
Upper Level	6,000	6,000	6,000	6,000	3,500	6,000

Table 2 - RA Levels

The RA will primarily be used for UA testing (R&D) along with other emerging technologies requiring segregated airspace. RA activations are expected to be primarily below the CTA, unless a DA activation is required, or with prior agreement with Airways.

Tāwhaki will be the Administering Authority and responsible for the RA. Airspace operations shall be in accordance with the General Procedures in Section 5.5.2.

5.2.2 Danger Areas

Six Danger Areas are requested. The DA form an expanding fan of airspace from Te Waihora (Lake Ellesmere), over Kaitorete, to a set of progressively larger areas further offshore.

The boundary of D1 – D5 is the same as for the Dawn temporary SUA application.

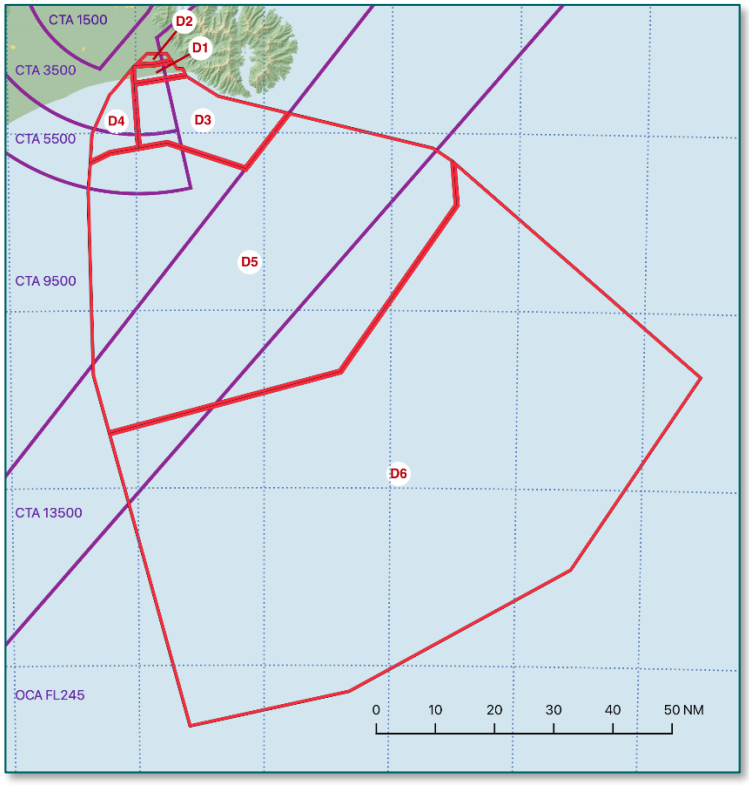

Figure 6 – Proposed Tāwhaki Danger Areas

The boundaries of the DA over Kaitorete Spit and immediately offshore (D1, D3 & D4) are aligned with the restricted area boundaries for R1, R2, R3, R4 and R6. Where D1, D3 and/or D4 are required the required RA below them would be activated as well (see Section 5.5.4.3).

DA	D1	D2	D3	D4	D5	D6
Lower Level	6,000	Surface	6,000	6,000	Surface	Surface
Upper Level	FL999	FL999	FL999	FL999	FL999	FL999

Table 3 - DA Levels

The NOTAM will contain details of the required activation altitude.

In the case of D1, D3 and D4, the lower limit of the DA is 6,000ft. This coincides with the upper limit of the RA below.

The DA will be used for UA testing (high-altitude, high-speed, long-range), rocket launch (e.g. sounding rockets) and other emerging technologies requiring segregated airspace.

The intention is for the SUA Proposal to be designated prior to the expiry of the existing temporary danger areas (TDA) for Kea and Dawn, thereby avoiding further TDA applications and enable continuous use.

5.3 Promulgation of Tāwhaki SUA

Details of the Tāwhaki SUA and flight operations procedures will be published by AIP Supplement and subsequently charted in the Visual Navigation Chart (VNC). This is the official aviation process for disseminating information of this nature.

5.4 Participants & Roles

There are several participants who interact to ensure safe aerospace operations in the airspace around the TNAC. The list below summarises these key participants along with the key roles at Tāwhaki required to deliver the safe operation of the Tāwhaki SUA. These terms are used throughout this document.

Administering Authority – Tāwhaki is designated as the Administering Authority under Part 71.153(b)(2) for the RA. Airspace operations will take place in accordance with the procedures summarised in this document along with any conditions the CAA require as part of the airspace designation. Approved procedures are contained within the Tāwhaki Airspace Coordination Plan.

Tāwhaki staff are onsite at the TNAC whenever test activities are being undertaken by Test Operators.

Key roles at the TNAC are:

- Head of Aerospace – Responsible for all aerospace activities at Tāwhaki.
- TNAC Manager – Responsible for the management of all activities at the TNAC.
- Airspace Coordinator – Responsible for ensuring the safe operation of the Tāwhaki SUA.

The Airspace Coordinator role is:

- an advisory/informing role, not an air traffic function
- the central point of contact for Airspace Users interacting with the RA and are responsible for the entry to, operation within and exit from the RA
- not shared with any other role to ensure all practical measures are in place to maximise safety outcomes and minimise workload related risks
- a qualified Flight Radio Telephony Operator (FRTO).

Test Operator – The innovator or user who has been authorised to conduct their activities from the TNAC and is the user of the RA and/or DA. The Test Operator shall have identified their single point of contact for airspace coordination and communication.

Airspace Users – All users of the airspace around Kaitorete and the TNAC. Examples include (but are not limited to):

- general aviation
- agricultural aircraft operators
- training schools
- clubs
- gliders / hang-gliders / paragliders / paramotors
- commercial air operators
- helicopter operators
- defence/Antarctic air operators.

Airways – Air Navigation Service Provider (ANSP) for Aotearoa and provides air traffic management services in controlled airspace.

5.5 SUA Concept of Operation

5.5.1 Overview

Several Test Operators use the TNAC, and whilst the operational cadence is currently relatively low, it is expected to increase over time. Tāwhaki believes in fair access to the airspace system and is committed to working with the airspace community to ensure the approach to the Tāwhaki SUA at Kaitorete works as intended.

Tāwhaki endeavours to minimise the impact of the Tāwhaki SUA activation on Airspace Users. This is undertaken by ensuring:

- only the required RA/DA are activated when required i.e. the airspace is not permanently active
- RA will be activated to enable Test Operators access to the DA
- the activity within the RA/DA is wholly contained within the active area, and
- procedures are in place to enable Airspace Users to transit the RA when it is safe to do so.

Furthermore, Tāwhaki is keen to work with the airspace community and ensure the proposal works for all, therefore, should a situation arise which requires discussion, please contact Tāwhaki directly.

5.5.2 General Procedures

5.5.2.1 Test Operator Application

Test Operators are required to complete an Application Process with Tāwhaki to use the TNAC.

This process is an integral part of the Tāwhaki Safety Management System (SMS) and includes the scope of the engagement, values alignment, concept of operations, and all operational documentation including insurance, safety plans including emergency response plan (ERP) and operational approvals from the CAA.

5.5.2.2 Tāwhaki SUA Activation Process

The Tāwhaki SUA shall be activated via the NOTAM process. NOTAM will contain the information on the area(s) being activated, the altitudes each zone is being activated to, and activation and deactivation timing.

The Administering Authority shall be the originator of the NOTAM for all the Tāwhaki SUA.

A NOTAM shall be raised 24-hrs in advance of their scheduled activation time for both RA and DA.

For DA activations, the following specific details shall be included in the NOTAM:

- Person or organisation responsible for the activity taking place in the DA
- Type of activity taking place in the DA

5.5.2.3 Communicating Activation Status

The Administering Authority shall broadcast the activation status of the Tāwhaki SUA on a dedicated VHF frequency ('SUA Frequency'). The SUA Frequency will be published in the AIP, charted and included in the NOTAM.

Tāwhaki recognises this adds another frequency into the mix around Kaitorete, however, on balance feel it will provide the best safety outcomes, given the recent establishment of the Ashburton CFZ along with the Banks Peninsula CFZ, and their proximity to the TNAC.

Tāwhaki proposes the following to clearly communicate the activation status of the Tāwhaki SUA, noting, phraseology is to be confirmed:

1. Inactive and no planned activation that day:
   A pre-recorded message will be broadcast on a loop: "All Tāwhaki Special Use Airspace is inactive."
2. Inactive with planned activation later that day:
   A pre-recorded message will be broadcast on a loop: "Caution – Airspace activation planned today from "*nnnn*" hours local. Check NOTAM for details"
3. Active
   - The pre-recorded message will be deactivated.
   - The Airspace Coordinator shall:
     - be onsite at the TNAC, and available on the Tāwhaki SUA Frequency at least 30-mins prior to RA/DA activation, and to at least 15-mins post RA/DA deactivation
     - monitor and communicate with Airspace Users on the SUA Frequency using a dedicated Callsign (TBD)
     - make radio calls on the Banks Peninsula CFZ and Ashburton CFZ announcing Tāwhaki SUA activation/deactivation.

At the end of a Test Operators activity (landing, cessation, cancellation or postponement), Tāwhaki shall deactivate the Tāwhaki SUA and broadcast on the relevant frequencies the SUA has been deactivated. Once deactivated, the Airspace Coordinator will reactivate the activation status automated message on the SUA Frequency and continue to monitor the relevant frequencies for a further 15-minutes.

5.5.2.4 Communications

The primary means of communication is via Very High Frequency (VHF) radio.

The keys point of contact for an operation will be included in the NOTAM.

Tāwhaki can also be contacted on "0800 TAWHAKI" (0800 8274254).

5.5.3 Restricted Areas

5.5.3.1 Airspace User Access

Where possible, Airspace Users will be permitted to fly within RA, provided:

- the pilot has received pre-approval from the Administering Authority, and
- no Test Operator aircraft operating in the RA e.g. the test aircraft is on the ground between flight tests.

Tāwhaki will engage with all Airspace Users to provide pre-approval briefings to enable their access to the RA when it is safe to do so. These briefing shall include procedures for the Tāwhaki aerodrome, procedures for airspace operations and agreement the aircraft is flown in accordance with the airspace procedures specified by the Administering Authority.

5.5.4 Danger Areas

5.5.4.1 No Using Agency

Tāwhaki propose no Using Agency be designated for the DA.

Tāwhaki will raise NOTAMS for both RA and DA. For the DA, the NOTAM will contain details of the operator (point of contact) and type of activity to be undertaken in the DA.

Primary points of contact are as follows, for each of the Tāwhaki SUA:

- RA – Tāwhaki (both when active and inactive)
- DA when Inactive – Tāwhaki.
- DA when Active – Operator, per NOTAM.

5.5.4.2 CAA Authorisation to use DA

Test Operators will require CAA authorisation to use the DA.

Accordingly, the Test Operator will have the Tāwhaki SUA designation included as part of their operational approval e.g. identified on their Part 102 Operations Specification in the case of UA operators.

5.5.4.3 Access via RA

Test Operators authorised to use the DA will only be able to access the DA via the RA. Accordingly, whenever the DA are requested, the RA will also be activated.

5.5.5 Off-Nominal Situations

Off-nominal situations are captured in the Tāwhaki SMS Risk and Hazard Management section. Strategic and tactical mitigations are identified to reduce the risks to as low as reasonably practicable. Examples of off-nominal situations include:

- Airspace Incursion
    - Airspace User aircraft entering the RA while its active and without authorisation.
- Airspace Excursion
    - Test Operator aircraft about to depart / departed the RA/DA

5.5.6 Emergency Situations

Tāwhaki will always support emergency situations.

Procedures will be documented in the Airspace Coordination Plan for emergency situations including:

- Airspace User aircraft requiring an emergency landing at the TNAC
    - As part of the Tāwhaki SMS and Operations Manual for the TNAC, procedures are in place with Test Operators to enable the safe landing of their aircraft in the case of external (e.g. Airspace User) emergencies at the TNAC.
- Airspace User transit through RA in an emergency e.g. Medical
    - This is only available in exceptional circumstances and will be followed up with the Airspace User after the event and recorded accordingly.

All emergency situations will be included as part of the Airspace User Pre-Briefings and will also be regularly reviewed and updated in line with Tāwhaki SMS continuous improvement objectives.

6 Effect on Air Traffic

6.1 Effect on IFR Traffic

6.1.1 IFR Context

Airways requires separation between controlled flights and the Tāwhaki SUA, of between 3nm and 5nm depending on the circumstances. When SUA are activated with upper limits infringing IFR routes or procedures, the active SUA may affect the following IFR traffic:

Overflights

- Domestic IFR Antarctic arrivals and departures via PEHRR.
- Overflights on Y890, Y727, Y545, Y477
- International overflights on user preferred routes

Christchurch International Airport Traffic

- NZDN-NZCH flights arriving to land via LADIS.
- Antarctic arrivals and departures via PEHRR.

The Tāwhaki SUA are laterally separated from all other overhead routes or SIDs and STARs by at least 5nm; and from low level helicopter routes via NOVTO by at least 3nm.

Restricted area R5 (not illustrated below) will not be activated in controlled airspace, i.e. not above 3,500ft, to remove any conflict with controlled IFR traffic.

The proposed DA and underlying RA infringe adjacent IFR routes and procedures exactly as for existing temporary SUA used by Dawn Aerospace. The proposed re-routes are currently accepted by Airspace Users and Airways when managing the existing temporary SUA.

Tāwhaki aims to minimise any effect on IFR traffic by:

- Operating all SUA with upper limits that are separated below the altitudes normally flown on IFR routes, and below the published climb/descent profiles for affected SIDs and STARs, to the maximum practicable extent,
- Enabling IFR traffic to avoid active SUA via a minor re-route using existing published IFR waypoints,
- Timing the use of SUA that unavoidably conflict with scheduled IFR traffic to minimise any effect.

To enable IFR traffic to re-route around active SUA should this be necessary:

- The Tāwhaki SUA are at least 5nm clear of a route between LADIS and HELGE,
- Danger area D4 may infringe some re-route options. It will be operated below the levels required by the re-route options to the maximum possible extent.

Tāwhaki anticipate that D4 will only be required for high-level operations briefly and infrequently. The Test Operators in this case have some flexibility with take-off times and will endeavour to time operations to minimise any effect on scheduled IFR traffic.

Tāwhaki proposes these operations will be formally coordinated with Airways. An agreement between Tāwhaki and Airways will outline activation protocols for existing and new Test Operators to enable those operations.

In the longer term, the use of the Tāwhaki SUA presents an opportunity to develop the data that could support regulatory progression towards dynamic use of shared airspace.

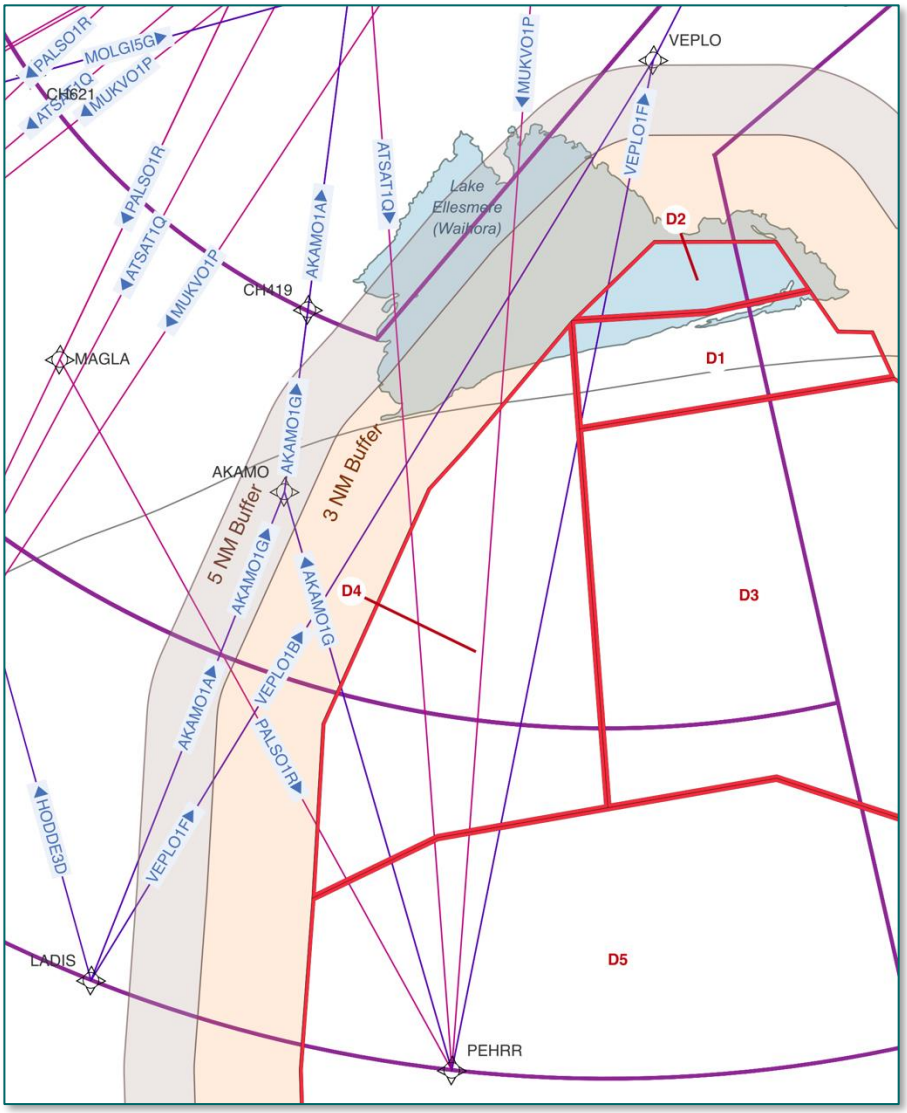

Figure 7 – Christchurch SID/STAR IFR Context

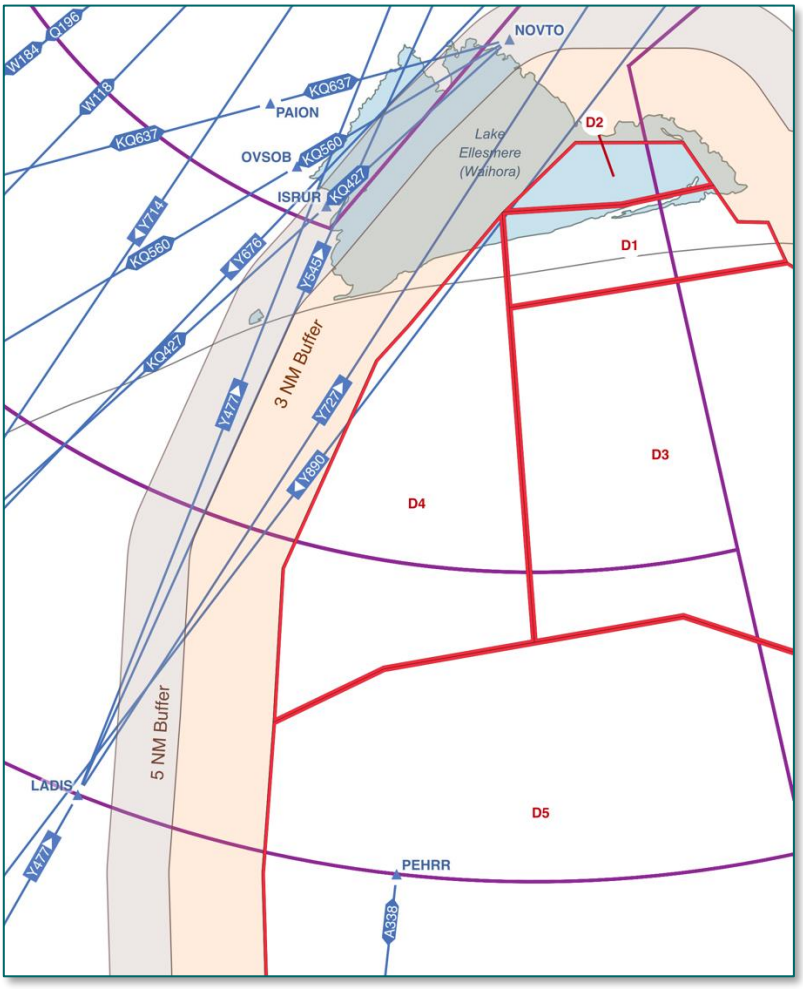

Figure 8 – IFR Route Context

6.1.2 Domestic IFR Traffic

Table 4 - Affected IFR Domestic Flights lists the domestic IFR traffic on affected routes and IFR procedures.

The Tāwhaki SUA affect at most about 10 flights daily from Dunedin, and up to 4 flights daily to or from Antarctica. Antarctic traffic is seasonal, operating mainly in the summer months.

All affected traffic can avoid the Tāwhaki SUA by flying minor re-routes. Appendix B illustrates possible re-routing options.

The suggested alternative routes would not affect the noise contours at Christchurch International Airport. The re-routed aircraft either (a) fly at high altitudes, or (b) create no change to existing noise profiles by flying the existing procedures in areas that affect airport noise.

Route/Procedure	Traffic Volume	Mitigation
Y890	Nil scheduled. ~5 GA flights/year	Minor re-route using published WPT/routes
Y727	2-3 daily scheduled. NZDN-NZWN	Minor re-route using published WPT/routes
VEPLO1B / VEPLO1F	6 daily scheduled. NZDN-NZCH	Minor re-route using published WPT
All SID/STAR via PEHRR	Seasonal Antarctic traffic. Up to ~4 flights daily on up to ~16 days per month December through February. Fewer flights in adjacent shoulder season months.	Minor re-route using published WPT or vectoring under surveillance control
Y477 north of LADIS ***if D4 active at altitude (rare)***	5 daily scheduled NZDN-NZAA	Minor re-route vectoring under surveillance control
VEPLO1B / VEPLO1F & AKAMO1A / AKAMO1G ***if D4 active at altitude (rare)***	6 daily scheduled. NZDN-NZCH	Minor re-route vectoring under surveillance control

Table 4 - Affected IFR Domestic Flights

6.1.3 International Overflights

Both Qantas and Latam airlines schedule 4-5 flights each per week between Sydney and Santiago. The flight paths differ daily, making the most of enroute winds. Flights generally pass well south of New Zealand, but may occasionally cross the country, on different paths each time. On average, a flight might pass close to or through the Tāwhaki SUA between one and five times per year. These flights would be affected only if Tāwhaki SUA were active at altitude at the time.

With advance warning via NOTAM (at least 2 hours prior to ETD), the airlines can plan an efficient minor alteration to the planned trajectory to avoid the Tāwhaki SUA at negligible cost.

6.2 Effect on VFR and Other Traffic

6.2.1 General Aviation

Tāwhaki endeavours to minimise the impact of the Tāwhaki SUA activation on Airspace Users, as described in Section 5.5. However, with there being some overlap between the Tāwhaki SUAs and part of both the Banks Peninsula CFZ, Ashburton CFZ, there may be a minor effect for some general aviation (GA) flights.

VFR traffic around Banks Peninsula can avoid the Tāwhaki SUA by remaining inland of the south-eastern coastline of Banks Peninsula, and northeast of the Te Waihora (Lake Ellesmere) shoreline.

The Tāwhaki SUA allows a 2.4nm wide passage for itinerant traffic transiting north/south past Christchurch CTA above 1,500ft over Lake Ellesmere.

Tāwhaki anticipate that GA flights would often be able to overfly the restricted areas along Kaitorete Spit. The RA will be activated from surface to the minimum height required. Where practicable, the restricted areas R1, R2 and R4 would be activated to altitudes that leave ≥1,000ft spacing between the upper limit of the active Tāwhaki SUA and the lower limit of controlled airspace.

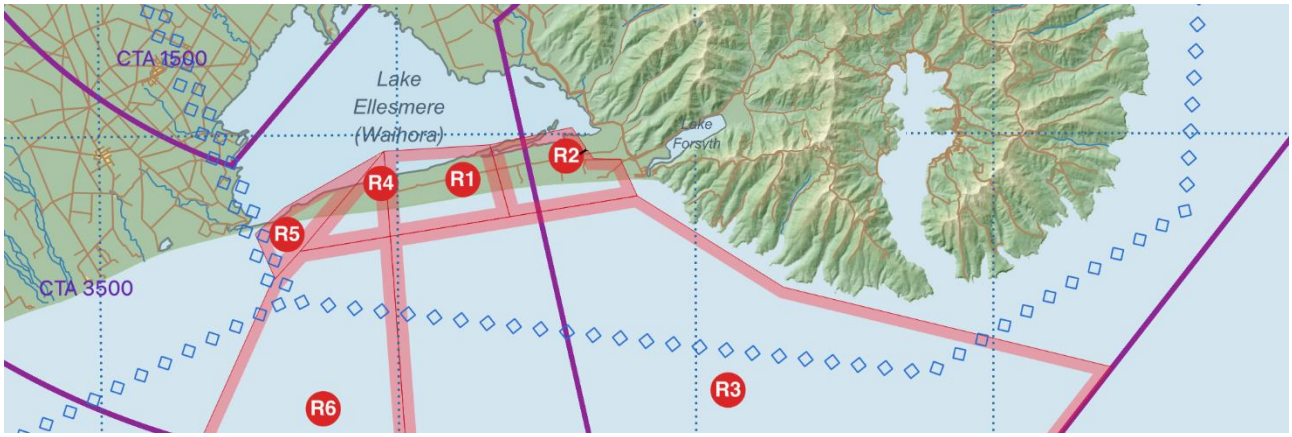

Figure 9 – VFR Context

6.2.2 Canterbury Aero Club (CAC) and International Aviation Academy

An MoU currently exists between Tāwhaki and CAC. This MoU and associated procedures will be updated in accordance with this proposal.

6.2.3 Agricultural (Ag) Operators on and around Kaitorete

Tāwhaki recognises Kaitorete is an area Ag Operators both operate within and overfly to access the Banks Peninsula.

Tāwhaki will work with Ag Operators to ensure lines of communication and procedures are in place to enable Ag operations to be undertaken with minimal disruption.

7 Stakeholder Engagement

The following organisations have been engaged during the development of this proposal.

Organisation	Relevant Activity	Point of Contact	Response	Notes
Airways	ANSP	Geoff Hounsell – Head of Terminal Airspace	Supportive.	1, 8
Christchurch International Airport	Airport	Ford Robertson	No objections.	
Air Transport Operators				
Air New Zealand	Airline	Steve Kelly – Manager Flight Operations Regulatory Affairs	Supportive.	2, 8
Qantas and Jetstar	Airline	Daniel Smith	Awaiting response.	3
Air Chathams	Airline	Matthew Emeny	No objections.	
RNZAF	Antarctic Flights and Maritime Surveillance	Richard "Dicko" Beaton – Wing Commander	Supportive.	
National Science Foundation	Antarctic Flights	Gary James	No objections.	10
Development Organisations				
Aerosearch	OEM and UAS operator	Michael Pervan - CEO	Supportive.	
Dawn Aerospace	OEM and UAS operator	Otis Rea – Flight Operations	Supportive.	
Defence, Science & Technology (DST)	Science & Technology (NZDF)	Adrian Weller – Team Lead	Supportive.	
Kea Aerospace Ltd	OEM and HAPS operator	Phillip Stott – Chief Operating Officer	Supportive.	
Snowdon Consulting	Vertical Launch OEM and Operator	Malcolm Snowdon Matthew Torckler	Supportive.	

Organisation	Relevant Activity	Point of Contact	Response	Notes
General Aviation				
Canterbury Airspace Users Group (CAUG)	Collective of local airspace users	Ford Robertson - Chairman	Awaiting response.	4, 8, 11
Canterbury Aero Club and International Aviation Academy	Flight Training	Jeremy Ford – CEO	Supportive.	12
Christchurch Helicopters	Helicopter Operator	Kevin Walsh - Pilot	No objections.	5
Garden City Helicopters Aviation	Rotary and Fixed Wing Operator	Daniel Currie - Owner	Awaiting response.	
Mid-Canterbury Aero Club	Aero Club	Travis Butler	In review.	6
Parapro Ltd	Paragliding	David Dennis - Director	Awaiting response.	
SkyFarmers	Agricultural Operator	Duncan Hart	Awaiting response.	
South Canterbury Aero Club	Aero Club	Tony Page	In review.	6
SuperAir	Crop Spraying	Kent Weir	Awaiting response.	9
Recreational Aviation				
Canterbury Recreational Aircraft Club	General aviation club	Iain McPhail – President Ryan Humphries - Pilot	No objections.	4
Air New Zealand Flying Club	Flying Club	Errol Smart - CFI	Awaiting response.	
Canterbury Hang Gliding and Paragliding Club	Hang gliding and paragliding	James Gibson – Airspace	No objections.	4

Organisation	Relevant Activity	Point of Contact	Response	Notes
Canterbury Gliding Club	Gliding	Kevin Bethwaite Rob Kerr	Supportive.	4
Gliding New Zealand	Gliding	Kevin Bethwaite – Airspace committee member (Southern)	Supportive.	4
Other				
Airline Operator and Pilots Association (AOPA)	Association	John Evans	In review.	6
New Zealand Airline Pilots Association (ALPA)	Union	John Hall Andrew Lindup Marnie Pomeroy Robin Parsons	Discussions ongoing.	7
Selwyn Flight Park	Aerodrome	Paddy Cooper Lisa Cooper	No objections.	
University of Canterbury (UC)	R902 Administering Authority	Saurabh Sinah Fred Samandari Adriel Kind	Supportive.	

Table 5 – Stakeholder Responses to SUA Proposal

Stakeholder Response Supporting Notes:

1) Airways have been supportive of the initiative of permanent SUA at the Tāwhaki National Aerospace Centre throughout the proposal's development. To ensure the most robust outcome, some technical details are being finalised between Tāwhaki and Airways around the separation of flight routes from the DA:
   - An additional DA has been created to enable greater flexibility for all, and
   - Airways and Tāwhaki will establish an agreement to facilitate the coordination of SUA activation and associated test operations.

2) Air New Zealand have been supportive of the proposal from the outset and have provided recommendations for enhancing the flexibility of the SUA, some of which have been included in this Proposal.

3) Jetstar operates on the overhead routes NZDN to NZAA once daily. For existing Test Operators, the effect on Qantas operations is identical to that of the Kea and Dawn danger areas which Qantas found to be acceptable. For new Test Operators, Jetstar would only be affected should D4 be activated to its full altitude during Jetstar flight operations, however, this is expected to be

infrequent, and only with prior agreement. Although a response has not yet been received, Tāwhaki does not anticipate any objection from Qantas.

4) Several Airspace Users have indicated a desire to fly to/from the TNAC on occasion. Tāwhaki are keen to support this and are developing an approach to enable this.

5) Christchurch Helicopters indicated they need to fly in the vicinity of Kaitorete occasionally. When that is the case, Christchurch Helicopters and Tāwhaki would coordinate ahead of time to ensure all requirements are agreed, prior to any flights taking place.

6) The Mid-Canterbury Aero Club, South Canterbury Aero Club and AOPA received the proposal after the initial distribution date. They have been contacted by Tāwhaki and are currently reviewing the proposal.

7) NZALPA and Tāwhaki are currently discussing some questions raised following their review of the SUA Proposal.

8) During several recent temporary SUA proposals, stakeholders recommended or indicated a strong preference for a single set of special use airspaces be established and managed by Tāwhaki, for all operators at the TNAC, rather than multiple SUA allocated to individual operators. This SUA proposal will provide this capability.

9) SuperAir confirmed they no longer operate in the South Island, but have been kept in the loop with the proposal.

10) The USAP have confirmed there is no issue with the proposed extended D6 offshore. Tāwhaki and USAP have established lines of communication, and Tāwhaki has also been looped in with flight schedules to Antarctica, to support Test Operator planning.

11) The SUA Proposal to be on the agenda at the next CAUG meeting.

12) The MoU between Tāwhaki and CAC will be updated to reflect the proposed airspace, and will be supported with procedures as appropriate.

8 Appendices

Appendix A Airspace Description

Identifier	Name	Lower Limit	Upper Limit	Remarks	Remarks to Working Hours
R1, R2, R3, R4, R6	TBA	SFC	NOTAM (max. 6,000ft)	[Activity or Purpose:] UAS testing and operations, emerging technology testing and rocket launches. [Organisation or Authority:] Tāwhaki National Aerospace Centre	[Active:] When advised by NOTAM.
R5	TBA	SFC	NOTAM (max. 3,500ft)	[[Activity or Purpose:] UAS testing and operations, emerging technology testing and rocket launches. [Organisation or Authority:] Tāwhaki National Aerospace Centre	[Active:] When advised by NOTAM.
D1, D3, D4	TBA	6,000ft	NOTAM (max. FL999)	[Activity or Purpose:] UAS testing and operations, emerging technology testing and rocket launches. [Organisation or Authority:] Tāwhaki National Aerospace Centre	[Active:] When advised by NOTAM.
All others	TBA	SFC	NOTAM (max. FL999)	[Activity or Purpose:] UAS testing and operations, emerging technology testing and rocket launches. [Organisation or Authority:] Tāwhaki National Aerospace Centre	[Active:] When advised by NOTAM.
NOTES: Upper Limit and Lower Limit are expressed in FT (Above Mean Sea-Level - AMSL) or FL (Flight Level)					

Table 6 – Proposed Special Use Airspace Description

Tāwhaki National Aerospace Centre - Proposed Special Use Airspace Boundaries

Boundary line types **CIR** *(Circle)*, **CWA** *(Clockwise Arc)*, **CCA** *(Counterclockwise Arc)*, **GRC** *(Great Circle)*, **RHL** *(Rhumbline)*, **FNT** *(geoborder i.e. a line following the road , etc)*

Identifier	Sequence	Remarks	Latitude	Longitude	Type	Arc Latitude	Arc Longitude	Arc Radius	
D1	1		435141.45S	1722936.95E	GRC				
D1	2		434835.89S	1722919.21E	GRC				
D1	3		434822.91S	1723439.55E	GRC				
D1	4		434745.84S	1723847.30E	GRC				
D1	5		434854.37S	1723952.13E	GRC				
D1	6		434856.00S	1724114.02E	GRC				
D1	7		435015.70S	1724204.06E	GRC				
D2	1		434835.89S	1722919.21E	GRC				
D2	2		434619.54S	1723235.13E	GRC				
D2	3		434619.94S	1723726.10E	GRC				
D2	4		434745.84S	1723847.30E	GRC				
D2	5		434822.91S	1723439.55E	GRC				
D3	1		435015.70S	1724204.06E	GRC				
D3	2		435336.03S	1724926.33E	GRC				
D3	3		435630.54S	1730601.18E	GRC				
D3	4		440602.82S	1725542.29E	GRC				
D3	5		440141.55S	1723719.89E	GRC				
D3	6		440230.47S	1723039.01E	GRC				
D3	7		435141.45S	1722936.95E	GRC				
D4	1		440502.25S	1721853.85E	GRC				
D4	2		440003.20S	1721921.18E	GRC				
D4	3		435321.20S	1722336.86E	GRC				
D4	4		435212.72S	1722504.48E	GRC				
D4	5		434835.89S	1722919.21E	GRC				
D4	6		440230.47S	1723039.01E	GRC				
D4	7		440319.89S	1722354.04E	GRC				
D5	1		444056.18S	1721913.64E	GRC				
D5	2		440955.19S	1721820.36E	GRC				
D5	3		440502.25S	1721853.85E	GRC				
D5	4		440319.89S	1722354.04E	GRC				
D5	5		440141.55S	1723719.89E	GRC				
D5	6		440602.82S	1725542.29E	GRC				
D5	7		435630.54S	1730601.18E	GRC				
D5	8		440217.77S	1733948.04E	GRC				
D5	9		440427.96S	1734421.21E	GRC				
D5	10		441206.53S	1734518.28E	GRC				
D5	11		444020.18S	1731806.62E	GRC				
D5	12		445046.50S	1722255.13E	GRC				
D6	1		444038.13S	1744356.34E	GRC				
D6	2		451343.72S	1741334.85E	GRC				
D6	3		453436.59S	1732034.43E	GRC				
D6	4		454031.08S	1724155.11E	GRC				
D6	5		445046.50S	1722255.13E	GRC				
D6	6		444020.18S	1731806.62E	GRC				
D6	7		441206.53S	1734518.28E	GRC				
D6	8		440427.96S	1734421.21E	GRC				
R1	1		434822.91S	1723439.55E	GRC				
R1	2		435100.20S	1723539.09E	GRC				
R1	3		435141.45S	1722936.95E	GRC				
R1	4		434835.89S	1722919.21E	GRC				
R2	1		435100.20S	1723539.09E	GRC				
R2	2		434822.91S	1723439.55E	GRC				
R2	3		434745.84S	1723847.30E	GRC				
R2	4		434854.37S	1723952.13E	GRC				
R2	5		434856.00S	1724114.02E	GRC				
R2	6		435015.70S	1724204.06E	GRC				
R3	1		435015.70S	1724204.06E	GRC				
R3	2		435336.03S	1724926.33E	GRC				
R3	3		435630.54S	1730601.18E	GRC				
R3	4		440602.82S	1725542.29E	GRC				
R3	5		440141.55S	1723719.89E	GRC				
R3	6		440230.47S	1723039.01E	GRC				
R3	7		435141.45S	1722936.95E	GRC				
R4	1		435141.45S	1722936.95E	GRC				
R4	2		435212.72S	1722504.48E	GRC				
R4	3		434835.89S	1722919.21E	GRC				
R5	1		435212.72S	1722504.48E	GRC				
R5	2		435312.35S	1722348.18E	GRC				
R5	3		435134.36S	1722248.71E	GRC				
R5	4		435037.72S	1722416.90E	GRC				
R5	5		434835.89S	1722919.21E	GRC				
R6	1		435141.45S	1722936.95E	GRC				
R6	2		440230.47S	1723039.01E	GRC				
R6	3		440319.89S	1722354.04E	GRC				
R6	4		440502.25S	1721853.85E	GRC				
R6	5		440003.20S	1721921.18E	GRC				
R6	6		435321.20S	1722336.86E	GRC				
R6	7		435212.72S	1722504.48E	GRC				

Table 7 - Proposed Tāwhaki SUA Boundaries

Appendix B IFR Re-routing Options

Affected IFR flights may avoid the Tāwhaki SUA with minor re-routing.

Affected IFR Route/Procedure	Normal Route	Alternative
Y727	… LADIS Y727 WARDS …	… LADIS Y477 CH Y393 WARDS …
Y890	… KAMDO Y890 MIPAK …	… KAMDO DCT MESIX Y676 IDARA Y814 MIPAK …
VEPLO1B / VEPLO1F	LADIS VEPLO….	LADIS DCT AKAMO DCT VEPLO …
PEHRR STARs	As published or vectoring under surveillance control	HELGE DCT LADIS then use STARs from LADIS
PEHRR SIDs	As published or vectoring under surveillance control	Use SIDs to IDARA then DCT HELGE

Table 8 – IFR Re-routing Options

Table 9 below provides an estimate of the effect the proposed re-routes would have on aircraft operating whilst the Tāwhaki SUA was active.

Runway	Current Procedure via PEHRR	Additional Flight distance (nm)	Change in flight time (C130J @348kt)[1]
STAR CH 20	PERHRR2F PEHRR4B	+3.64	37s
STAR CH 02	PEHRR4A	+0.08	0.8s
SID CH 02	MUKVO1P	+6.45	1m7s
CH 02 DEP	Traditional vectoring	+4.2	43s
SID CH 20	ATSAT1Q	+4.5	46s
SID CH 29	PALSO1R	-0.92	-9.5s

Table 9 - Estimated effect of proposed re-route options

[1] The longer flight path does not necessarily change the duration of climb or descent. Additional flight time is therefore incurred in the cruise phase of flight. The example change in flight time assumes a representative cruise ground speed.

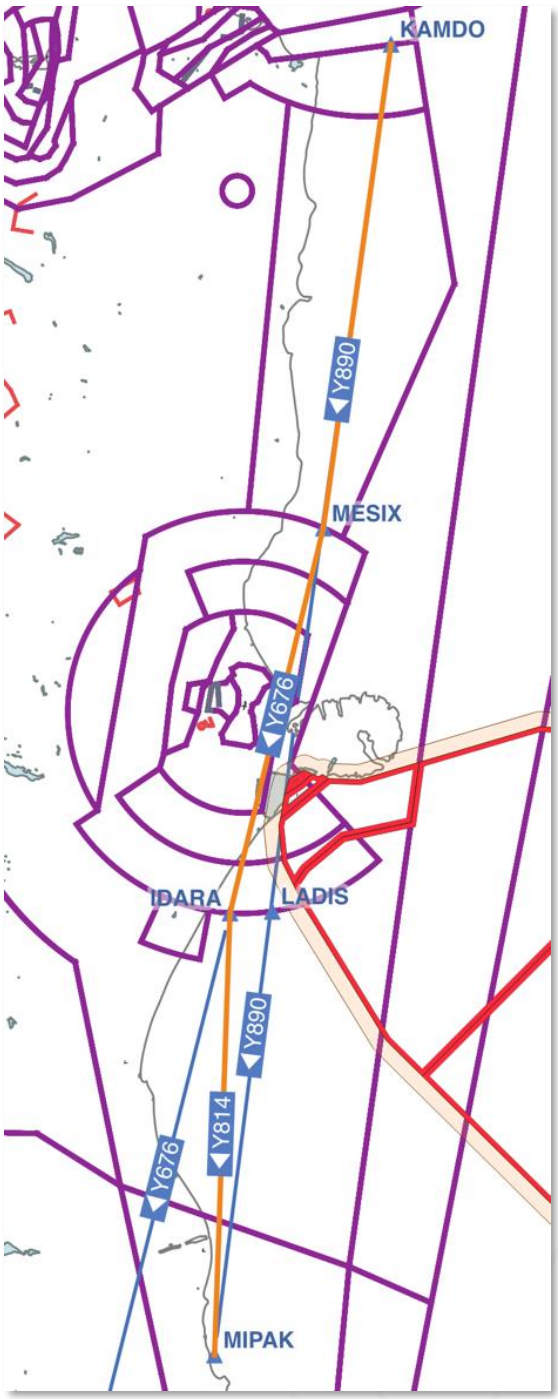

Figure 10 – Y890 Re-route Option

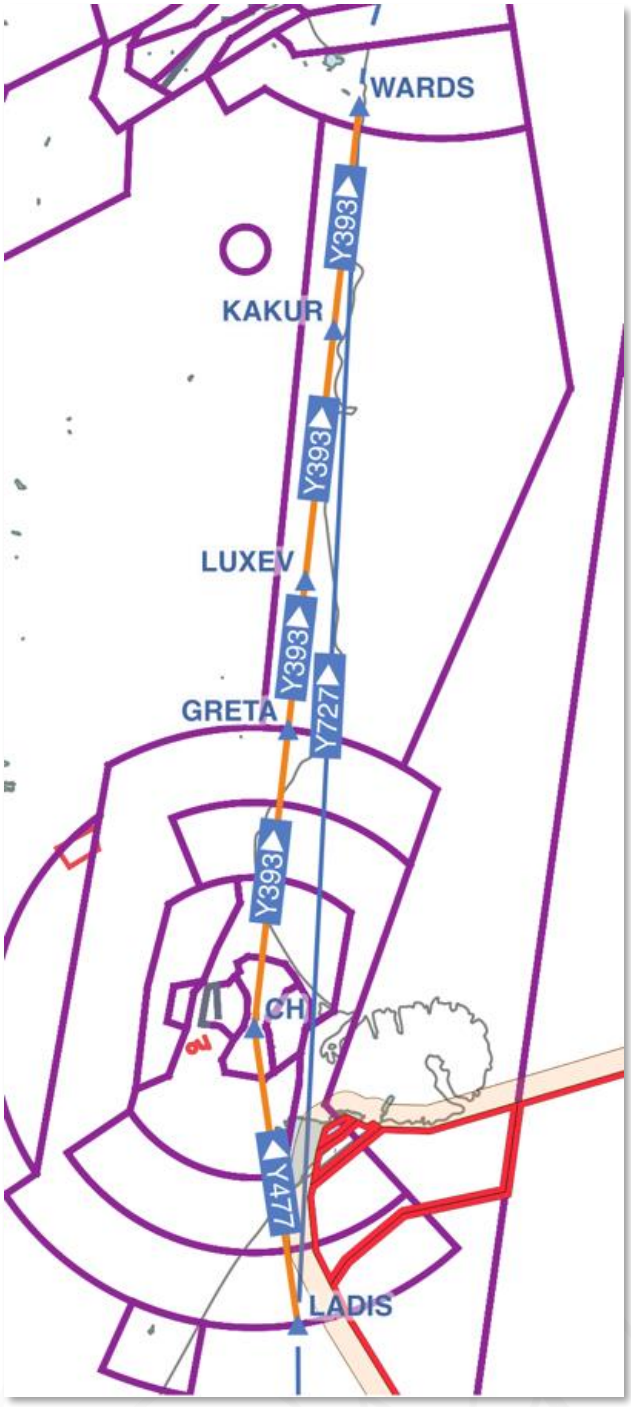

Figure 11 – Y727 Re-Route Option

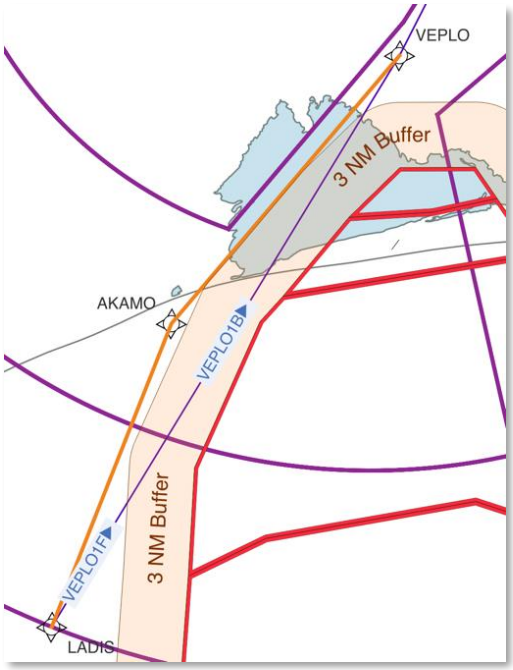

Figure 12 – VEPLO1B/VEPLO1F Re-route Option

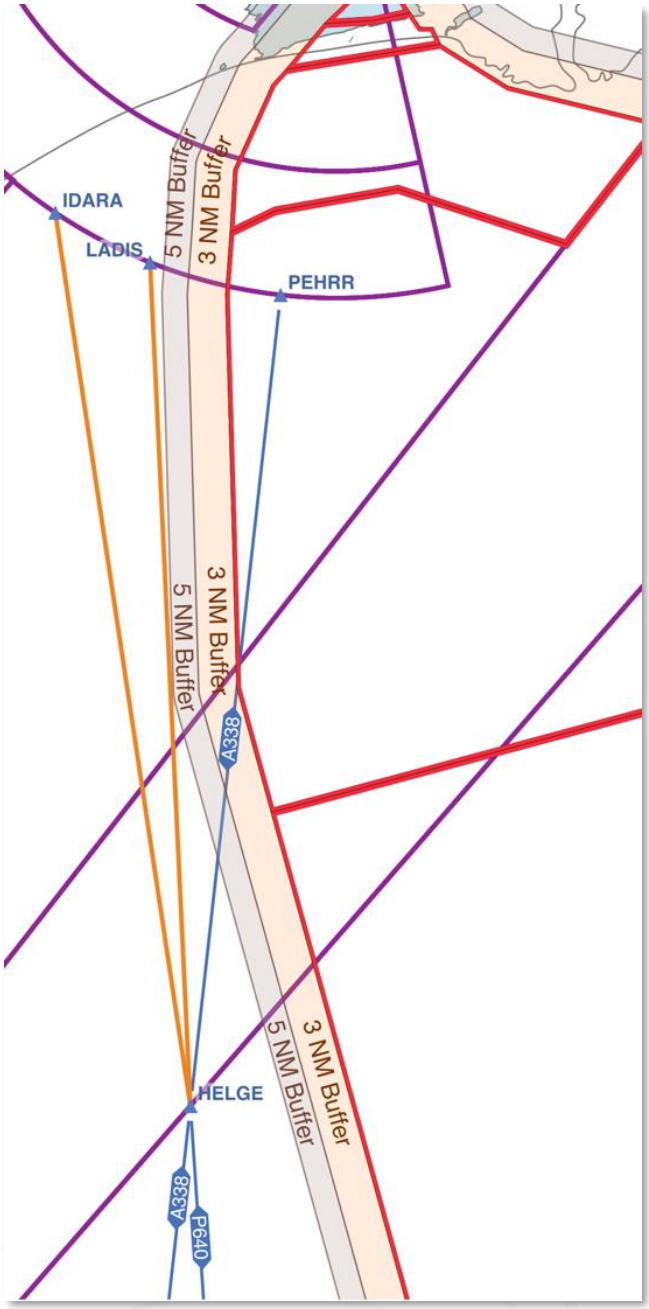

Figure 13 – Antarctic Flights via PEHRR Re-Route Options

Appendix C Glossary

Term	Definition
"nnnn"	Time in hours
ADS-B	Automatic Dependent Surveillance-Broadcast
Ag	Agricultural aircraft operator
AIP	Aeronautical Information Publication
AMSL	Above Mean Sea Level
ANSP	Air Navigation Service Provider; Airways
ATC	Air Traffic Control
CAA	Civil Aviation Authority
CAC	Canterbury Aero Club
CAUG	Canterbury Airspace User Group
CFZ	Common Frequency Zone
CTA	Control Area
DA	Danger Area
ERP	Emergency Response Plan
FL	Flight Level
FRTO	Flight Radio Telephony Operator
ft	Feet (measurement)
GA	General Aviation
IFR	Instrument Flight Rules
MoT	Ministry of Transport
MoU	Memorandum of Understanding
NOTAM	Notice to Airmen
NZCH	Christchurch Airport
NZDN	Dunedin Airport
NZWN	Wellington Airport
R&D	Research & Development
RA	Restricted Area
Ref.	Reference
RPAS	Remotely Piloted Aircraft System
SFC	Surface

Term	Definition
SID	Standard Instrument Departures
SMS	Safety Management Plan
STAR	Standard Instrument Arrivals
SUA	Special Use Airspace
T&E	Test & Evaluation
TBA	To be arranged
TBD	To be determined
TNAC	Tāwhaki National Aerospace Centre
UA	Uncrewed Aircraft
UC	University of Canterbury
VFR	Visual Flight Rules
VHF	Very High Frequency
VNC	Visual Navigation Chart

Table 10 - Glossary