

Airways New Zealand updated submission to the Civil Aviation Authority's 2018 Nelson and Marlborough Airspace Review

Prepared by: John Wagtendonk
Policy, Standards and Safety Improvement
Airways New Zealand

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Below is the Airways New Zealand (Airways) updated submission to the CAA 2018 Nelson and Marlborough Airspace Review. This submission replaces our earlier submission dated 11 January 2018.

This updated submission has control area (CTA) changes to the south and south west of Nelson – mainly slightly less CTA being requested due to further development of the Nelson PBN procedures. No control zone (CTR) changes with this latest version 9. Significant text changes are highlighted by a vertical bar in the left margin.

This submission requests a reduction in the size of the Nelson control zone (NS CTR) and significant changes to the Nelson control area (NS CTA).

Airways understands that a full review of the Woodbourne CTR and associated airspace will be made during 2018. Airways makes no requests for changes to the Woodbourne CTR at this stage however, we do request with this submission that the classification of the Woodbourne CTA 3500 ft to 9500 ft overhead Woodbourne is changed from Class D to Class C.

A primary driver for the airspace layout detailed in this paper is the correct airspace containment of new performance based navigation (PBN) IFR procedures being developed by Airways for Nelson. These PBN procedures are nearing design finality but some further developments may occur which could result in some changes to the draft airspace layout as detailed in this submission.

The VOR-based IFR procedures at Nelson also need to be correctly contained by controlled airspace. Many of the existing instrument flight procedures at Nelson are not correctly contained by the existing controlled airspace.

Another driver for the airspace changes is the Airways desire to minimise controlled airspace, particularly control zones, as much as practical. This desire is in-line with CA Rule 71 Designation and Classification of Airspace.

The various CTA blocks are all at least 700 ft above the underlying terrain in accordance with CA Rule 71.53(c)(2)(ii) – yet to be confirmed by Aeropath.

Aeropath are still in the process of confirming that the draft airspace does correctly contain all the instrument flight procedures (IFPs) that will be effective with the new airspace.

The co-ordinates for the requested airspace are not included in this submission – they can't be confirmed until after Aeropath has checked them. But the draft co-ordinates are available on request.

As part of the PBN implementation process, some consultation with Nelson operators and airlines has been conducted by Airways. Much of the content of this submission was used/sent in that consultation. To date, Airways has not received any written feedback.

Diagram 1 below depicts the Airways proposed amended Nelson control zone (NS CTR) and Nelson control area (NS CTA). The white lines are the existing airspace boundaries that would be deleted.

- Transit lane T657: northern and western portions to be disestablished - southern portion to be amended.

**NS Airspace Amend
DRAFT v9 12 February 2018**

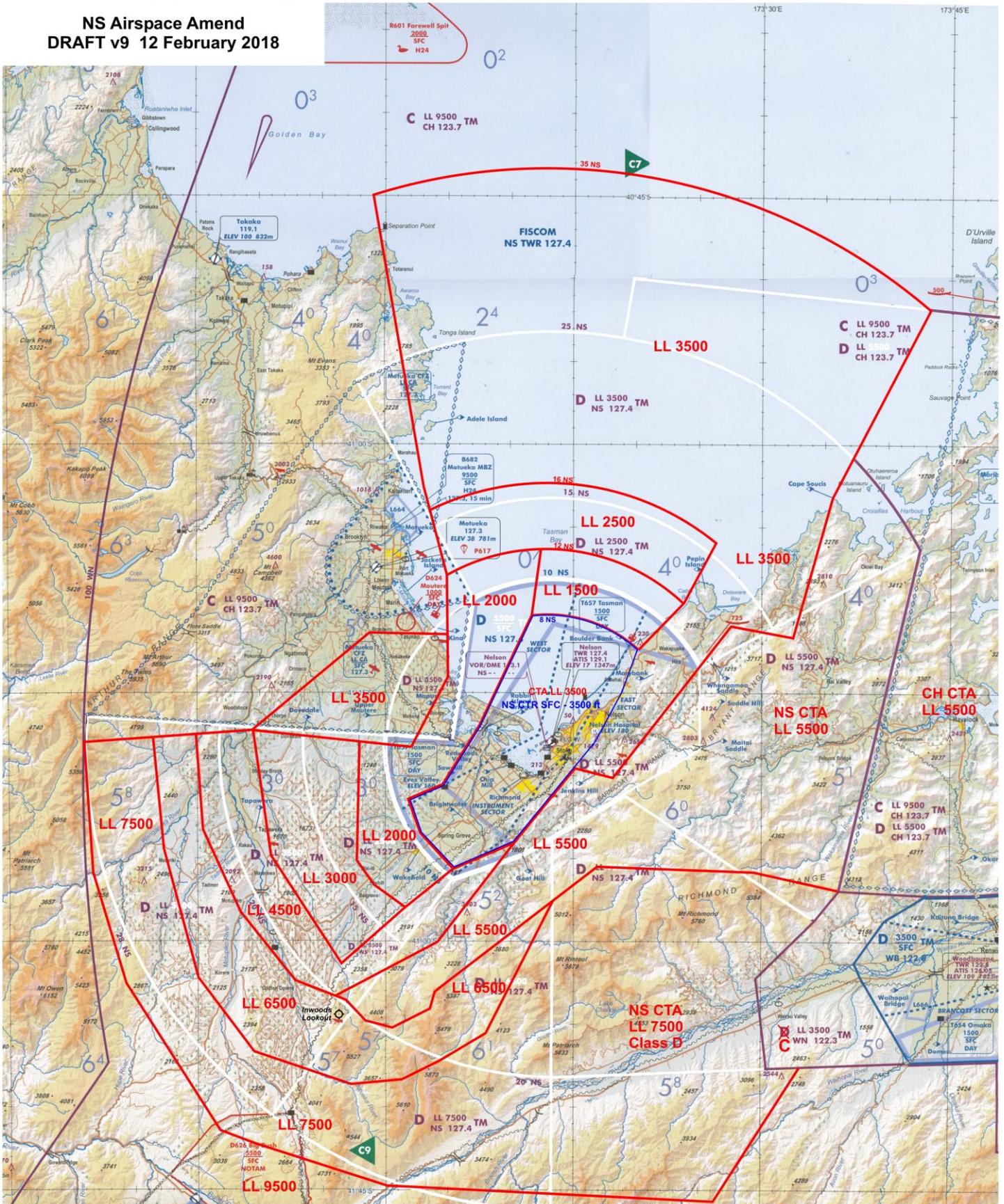


Diagram 1 Draft v9 NS CTA and CTR

The draft CTR

Diagram 2 below is a close up of the draft NS control zone (CTR) – the thin blue line. Note the significant reduction in the CTR to the east of Nelson airport. The eastern boundary of the draft CTR lies 2 NM to the east of the airport. This would provide sufficient protection to light aircraft operations in the non-standard circuit to the east.

The draft CTR (and the CTA) is designed to contain the VOR/DME teardrop approaches based on the aircraft flying a continuous descent profile, including during the base turn, of not shallower than 300 ft per NM to runway threshold.

The western boundary of the draft CTR provides for containment of the Cat A, B and C circling areas for the IFR approaches. Unfortunately, the western boundary can not be brought closer to lie over Rabbit Island bridge as doing that would infringe the Cat C circling area (4.2 NM radius from RWY 02/20 thresholds).

Diagram 2 depicts the existing transit lane T657. The Airways submission is that the northern and western portion of the transit lane will be disestablished but a modified transit lane will be retained in the southern portion of the CTR. Refer to Modified transit lane paragraph next page.

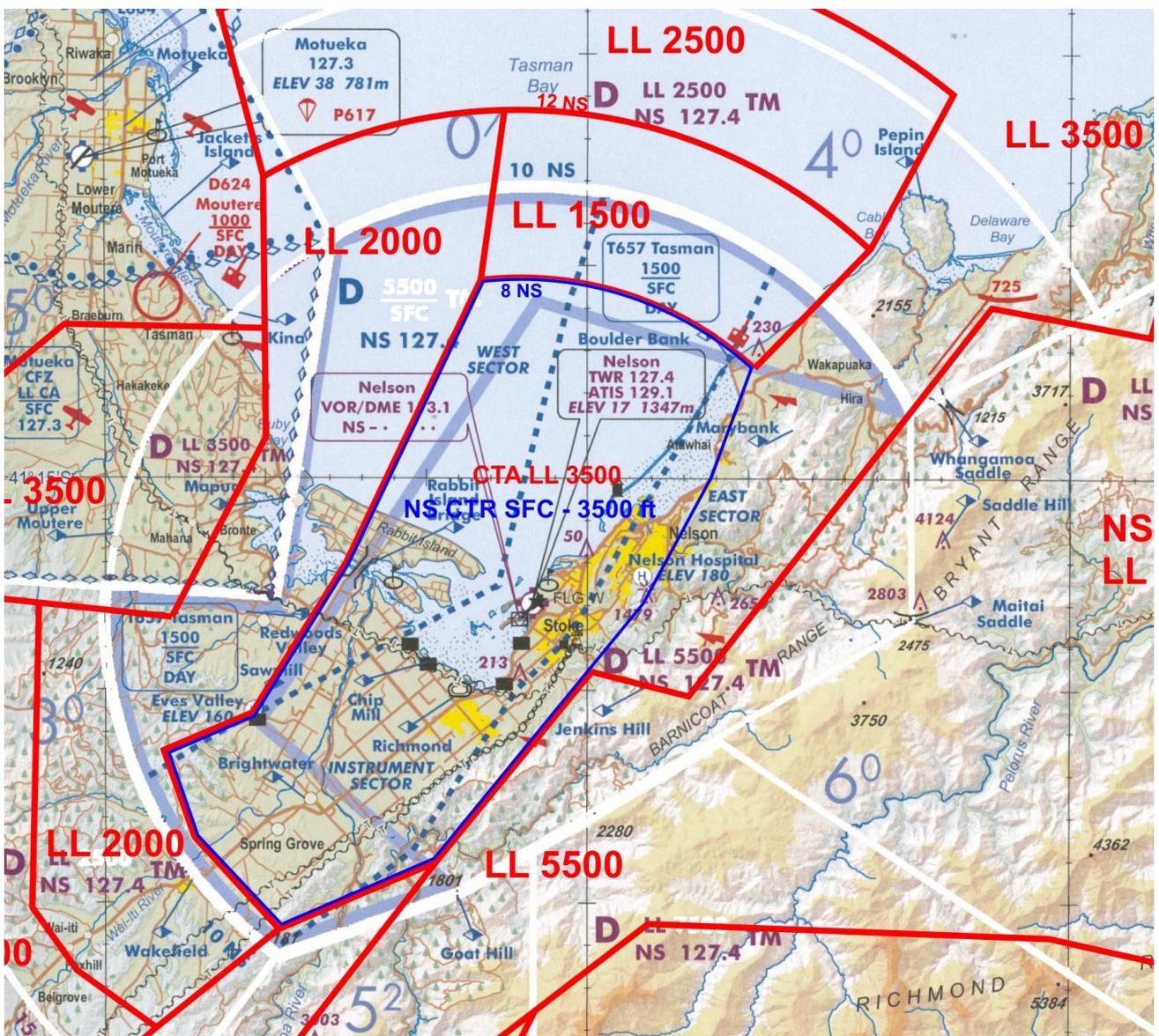


Diagram 2 Close up of Draft CTR

The instrument sector depicted on Diagram 2 will be modified slightly to correctly fit the requested CTR and approaches.

Modified transit lane.

Feedback received from operators is that the western and northern portion of T657 should be disestablished however, there is a need for the transit lane to remain in the southern portion to facilitate VFR transits to and from Malibu Park airfield and some other fields regularly used by light aircraft.

The existing transit lane T657 (SFC to 1500 ft) infringes the VOR/DME C and RNAV (GNSS) RWY 02 approaches. Diagram 3 below depicts the inbound legs of the RNAV (GNSS) RWY 02 approach along with the lateral containment fan to the left and right of the final approach track. Also marked is the point on the approach track at 6.61 NM where the airspace containment profile of 300 ft per NM from runway threshold descends through 2000 ft.

Inside 6.61 NM from the threshold, the airspace containment profile for the approach is lower than 2,000 ft and is less than the minimum 500 ft above the transit lane. Therefore, the approach is not correctly contained in regards to the transit lane – the transit lane infringes the containment of the approaches.

The same situation exists for the VOR/DME C approach.

For correct airspace containment of those approaches, T657 would need to be reduced in size – horizontally and/or vertically.

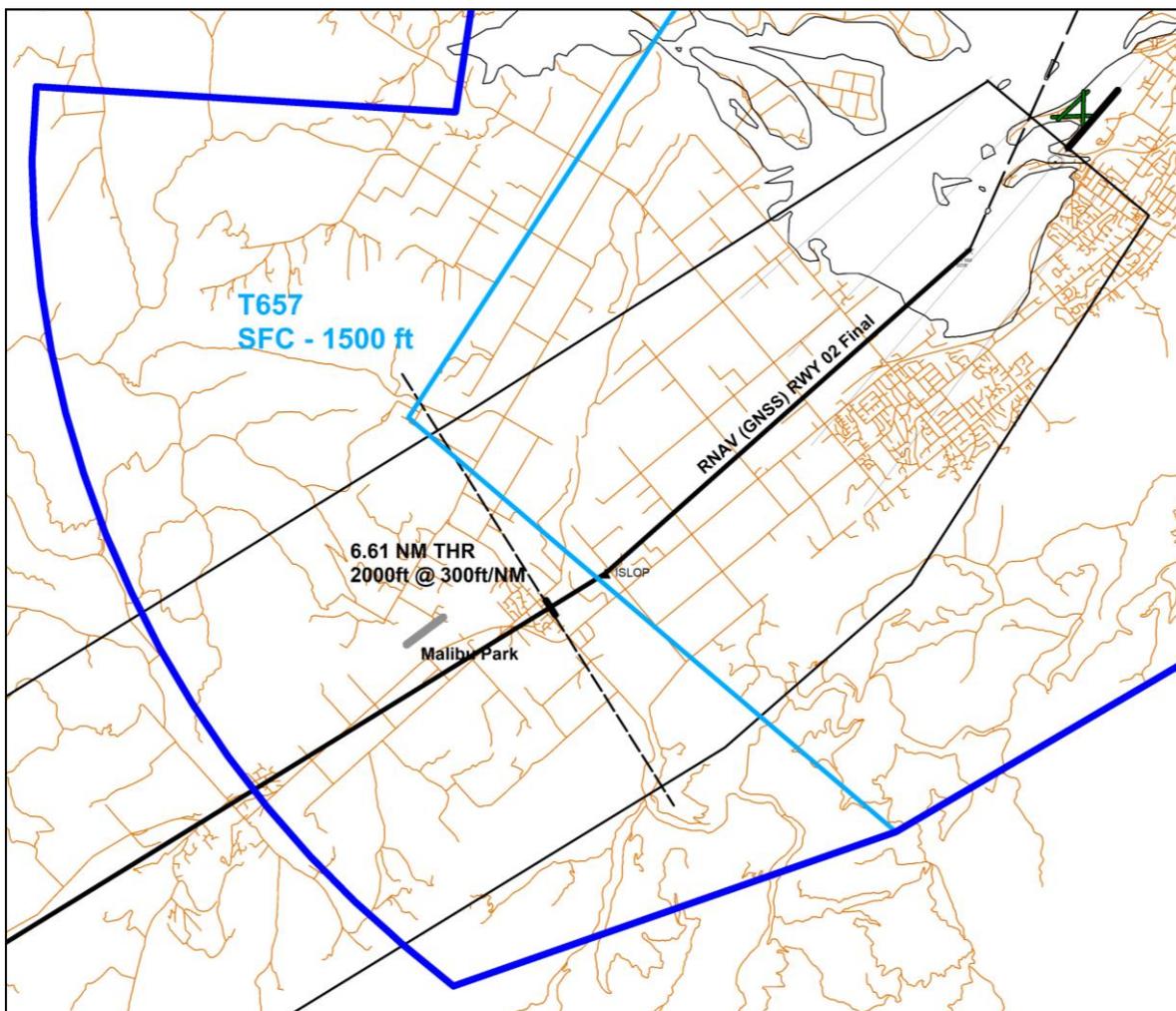


Diagram 3 detailing infringement of RNAV approach by T657

Some options regarding reducing the size of T657 so that the IFR approaches would not be infringed are described below. Note that the following airspace containment criteria are applicable regarding transit lane situations such as this;

1. 300 ft per NM profile from/to RWY threshold is applied for the IFR approach; and
2. the full width of the IFR approach fan needs to be protected at that 300 ft per NM profile; and
3. the transit lane must be at least 500 ft below the 300 ft per NM profile of the IFR approach; and
4. a 1 NM horizontal buffer needs to be applied unless the transit lane boundary is a very prominent feature such as a road or river.

Transit lane options are;

1. to retain the current boundary of T657 the upper limit would need to be reduced to 900 ft AMSL;
2. to retain the 1500 ft upper limit, the inner boundary of T657 would need to be moved west to lie 1 NM west of Brightwater, over the top of Malibu Park airfield;
3. Diagram 4 depicts an option with a 1200 ft upper limit with the inner boundary through Brightwater – note that the inner boundary does not follow prominent geographical features and therefore a 1 NM buffer needs to be applied; and
4. Diagram 5 depicts an option with a 1400 ft upper limit with the inner boundary following prominent geographical features being Eves Valley Rd, short sealed road, metalled road, Waimea West Rd, Ellis St, River Terrace Rd and Lee Valley Rd.

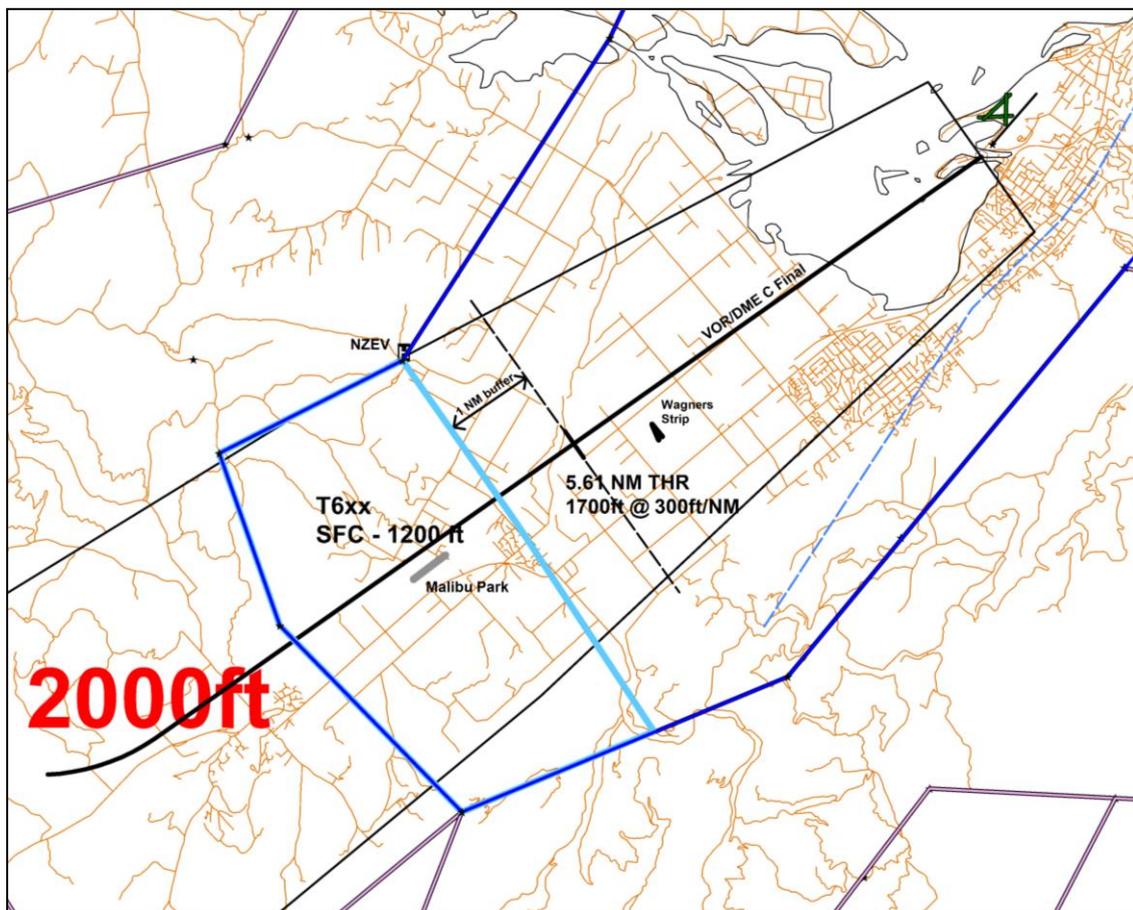


Diagram 4 detailing transit lane option 3 – inner boundary does not follow prominent geographical features

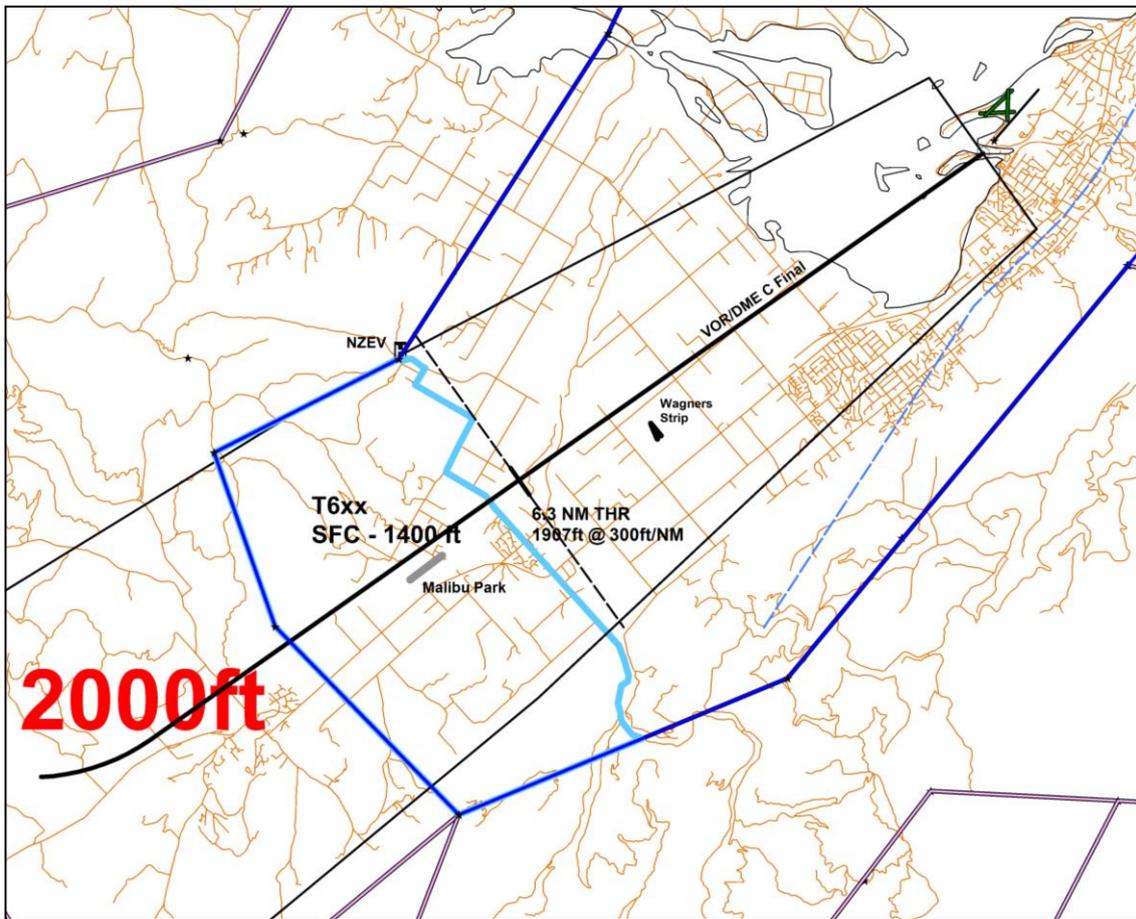


Diagram 5 detailing transit lane option 4 – inner boundary does follow prominent geographical features (roads)

At the 20 October 2017 Airways PBN consultation meeting held at Nelson, the feedback from attendees was that option 4 should be adopted.

This option is also suitable for the RNAV approach and departures – although the departures would need to specify a slightly steeper gradient than 5% to 1900 ft to clear the 1400 ft upper limit of the transit lane.

Operators said that the specified roads for the inner boundary were easy to see.

In light of the feedback, the Airways submission is for the retention of the southern portion of T657 with modified boundary as per option 4/Diagram 5 and upper limit lowered to 1400 ft AMSL.

Eves Valley Heliport

As depicted on the Google Earth image below, the Eves Valley heliport (NZEV) is just outside the requested CTR.

If the requested CTR is adopted, Airways suggests to the operator that the extent of the NZEV APCH/DEP Sector should be reviewed – the current 200° 020° track goes inside the CTR.

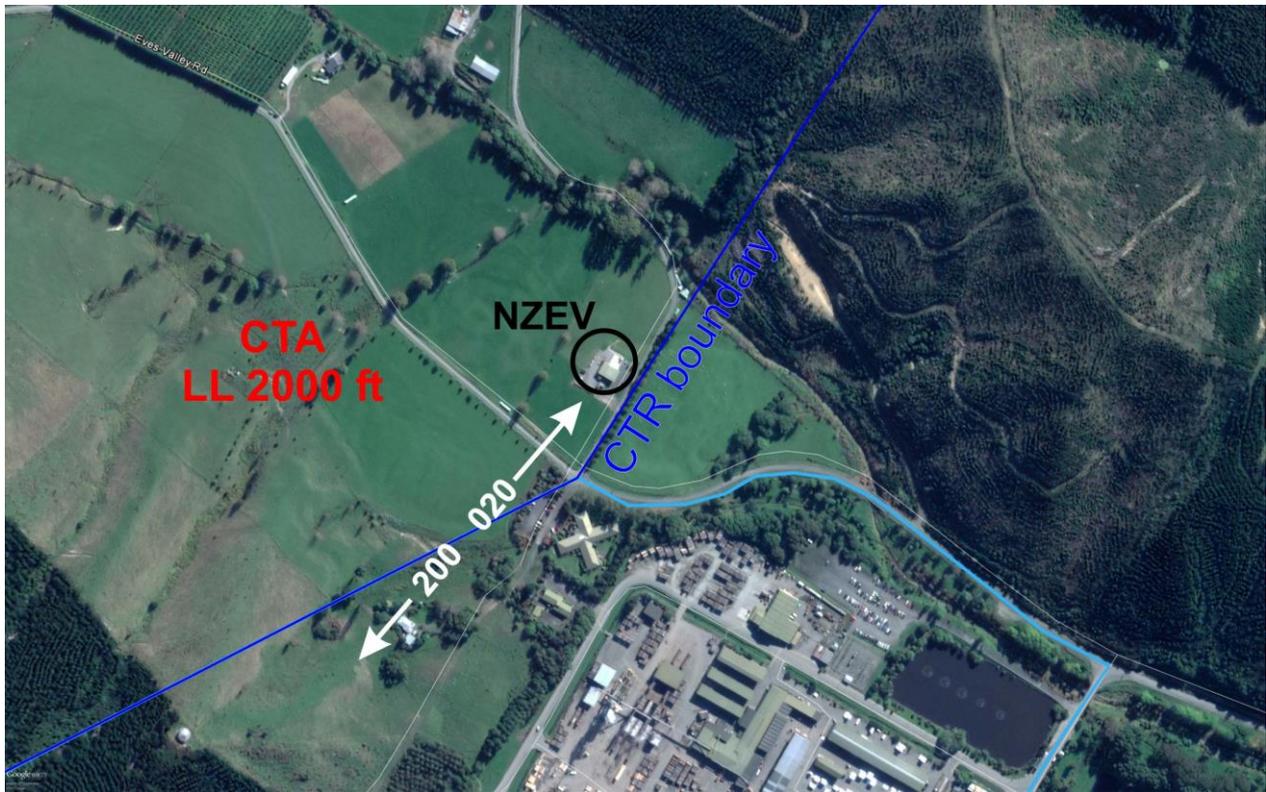


Diagram 5 Google Earth image showing the location of Eves Valley heliport (NZEV), the draft CTR (blue line) and the inner boundary of transit lane option 4 (light blue line)

Barnicoat paragliding and hang gliding area

The Google Earth image below depicts most of the Barnicoat paragliding and hang gliding area to the east of Stoke.

With the draft new CTR and CTA, most of Barnicoat area will be below/outside controlled airspace however, the western portion will be within the draft CTR.

The depicted Instrument Sector boundary is probably in the correct position but is still subject to final confirmation from the procedure designers. The Ngawhatu Road landing field is still outside this instrument sector boundary and the Saxton Field landing site is still just inside the instrument sector.

Bringing the CTR boundary into the boundary of the Barnicoat area was considered but the Airways position is that it would result in the CTR being too narrow to the east to adequately contain circuit operations to the east of Nelson airport.

It is proposed that hang gliding and paragliding operations within the draft CTR would continue in accordance with an MOU between Airways (NS TWR) and the Tasman Hang Gliding and Paragliding Club.

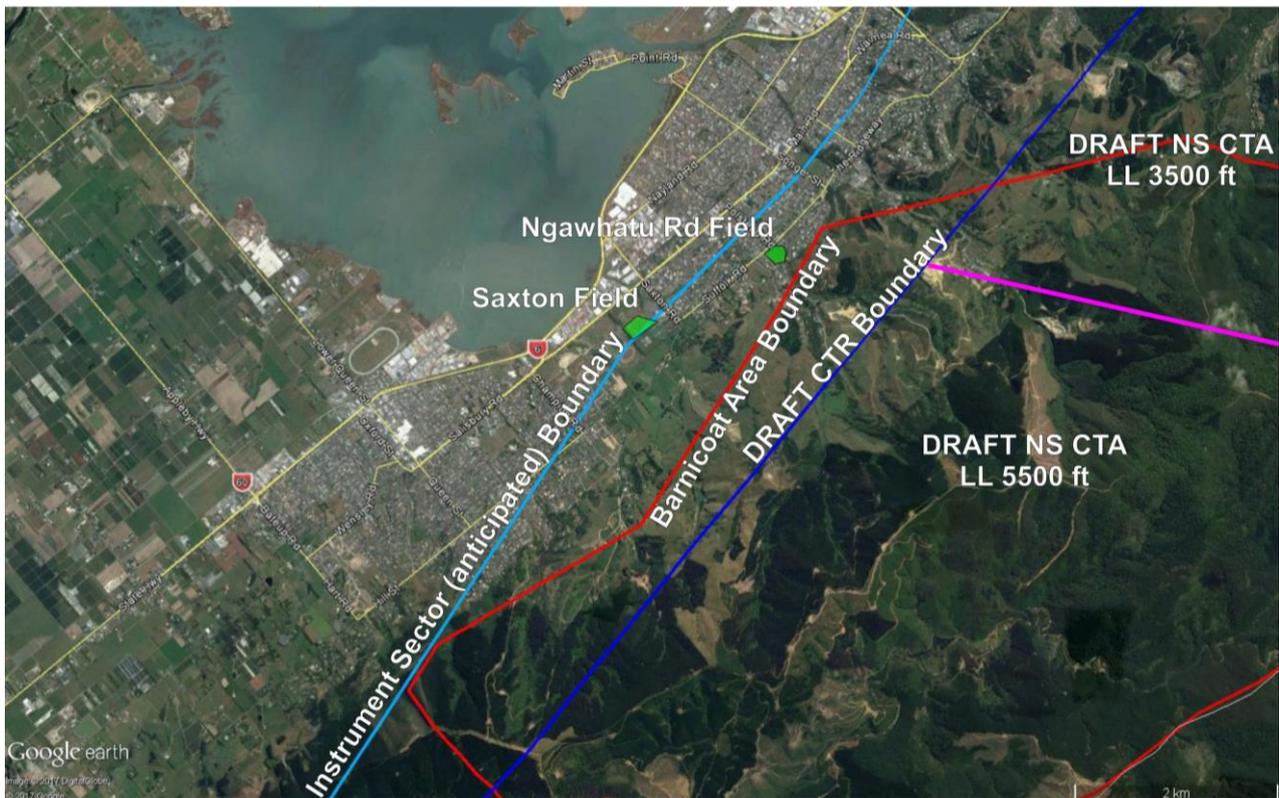


Diagram 6 Google Earth image showing the draft CTR boundary (blue line), anticipated instrument sector (light blue line) and Barnicoat hang gliding and paragliding area (red line). The two landing sites are also depicted in green.

The draft CTA north of Nelson

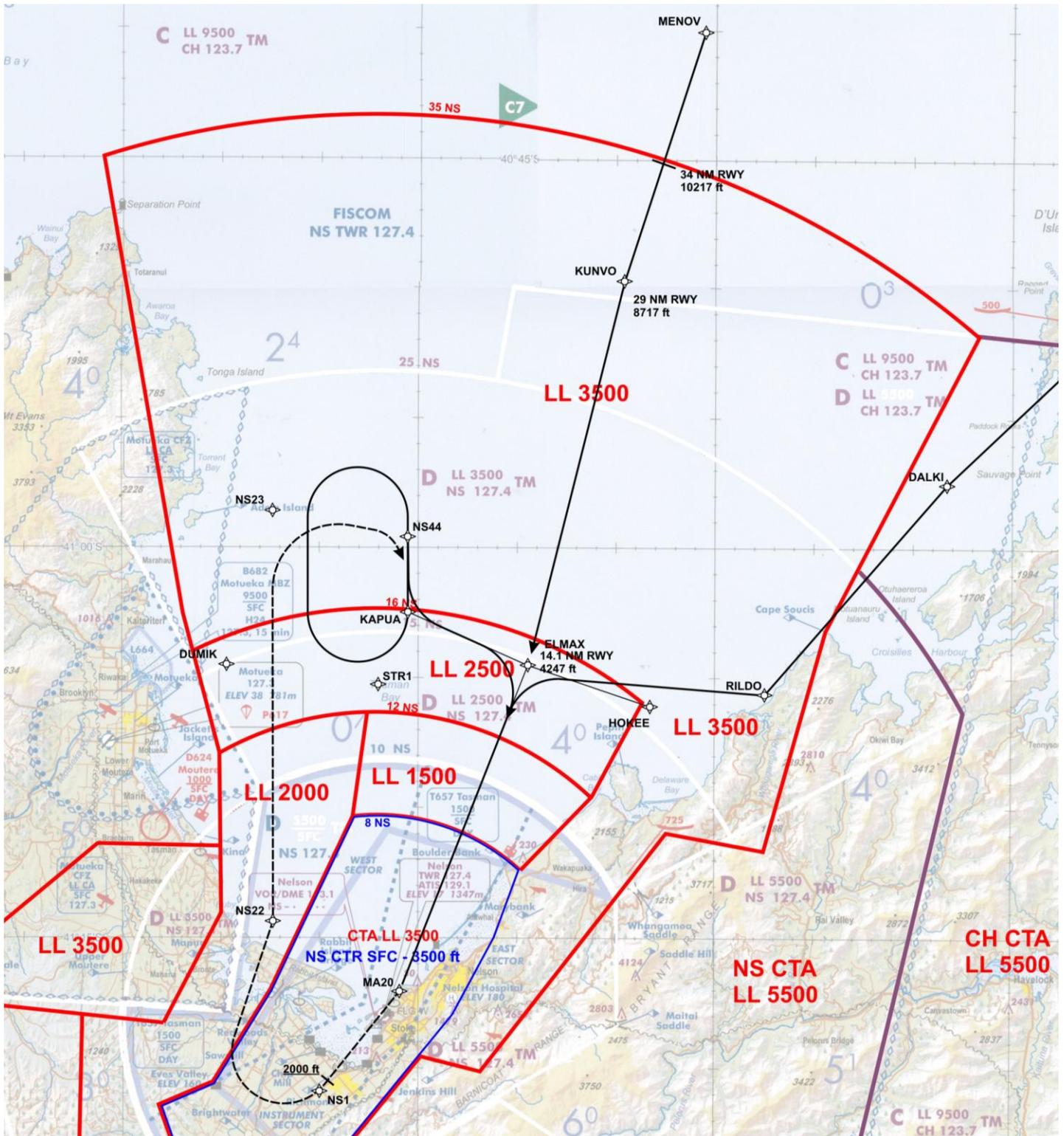


Diagram 7 Draft CTA to the north

The extensive CTA LL 3500 ft to the north of Nelson is required to provide airspace containment for the planned new missed approach holding pattern at KAPUA and the holding pattern at ELMAX. CTA below 10,000 ft is also needed out to 35 NM NS to contain the descent profile of the new PBN arrival to RWY 20 via MENOV and KUNVO waypoints.

The western boundary of the CTA near Ruby Bay is primarily determined by the new PBN departure off RWY 02 to NZCH. As shown on Diagram 8, the SID passes through 4007 ft immediately prior to the coast at Ruby Bay. That is based on the published departure specifying a minimum net climb gradient of 350 ft/NM (5.8%) to 4000 ft (or steeper).

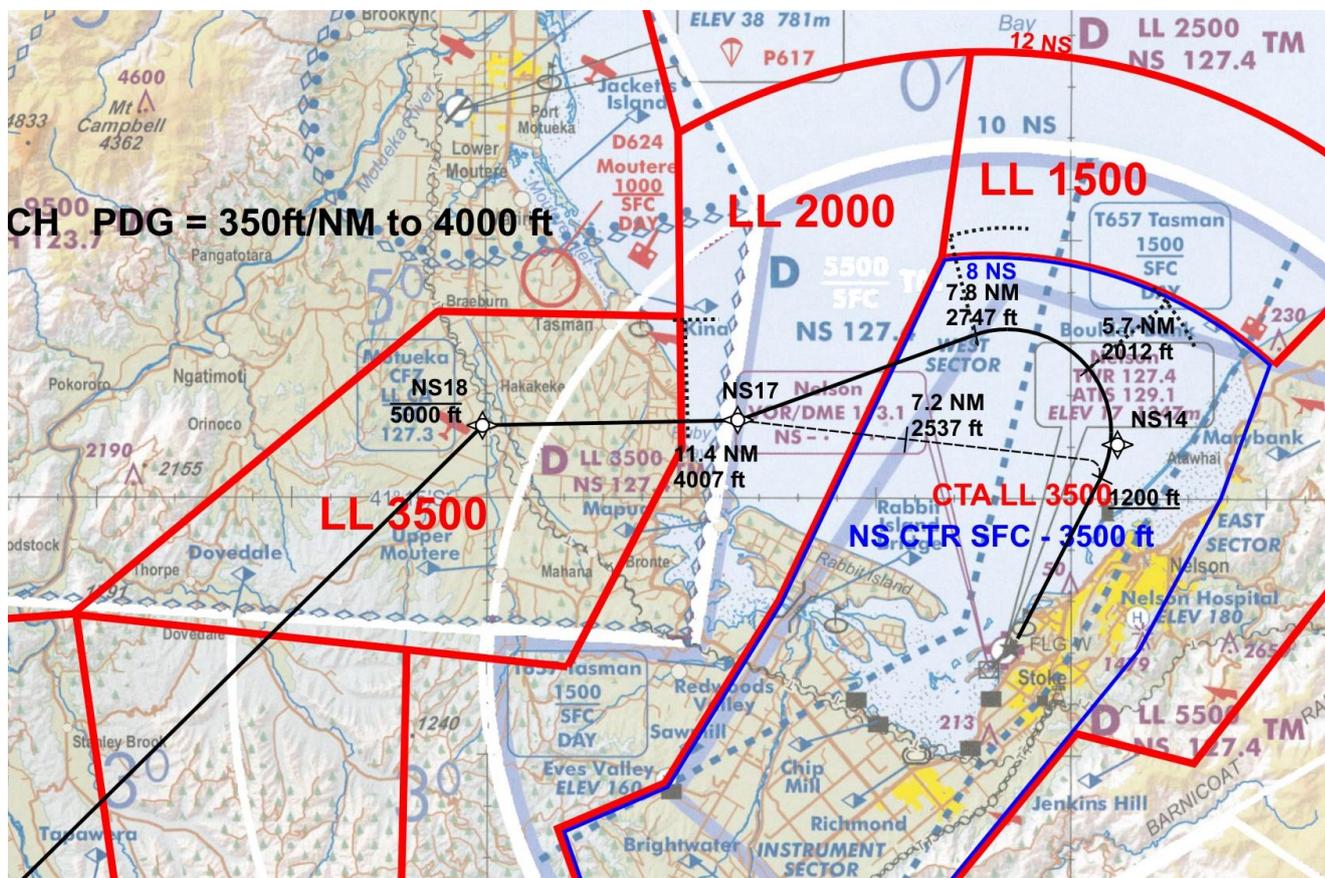


Diagram 8 Draft CTA to the west.

Black line is the new PBN departure off RWY 02 to NZCH with distance/altitude checkmarks shown.

The new PBN SID to NZAA off RWY 20 is shown in Diagram 9 below. The CTA boundary near Ruby Bay provides the required 2 NM buffer from the RNAV departure.

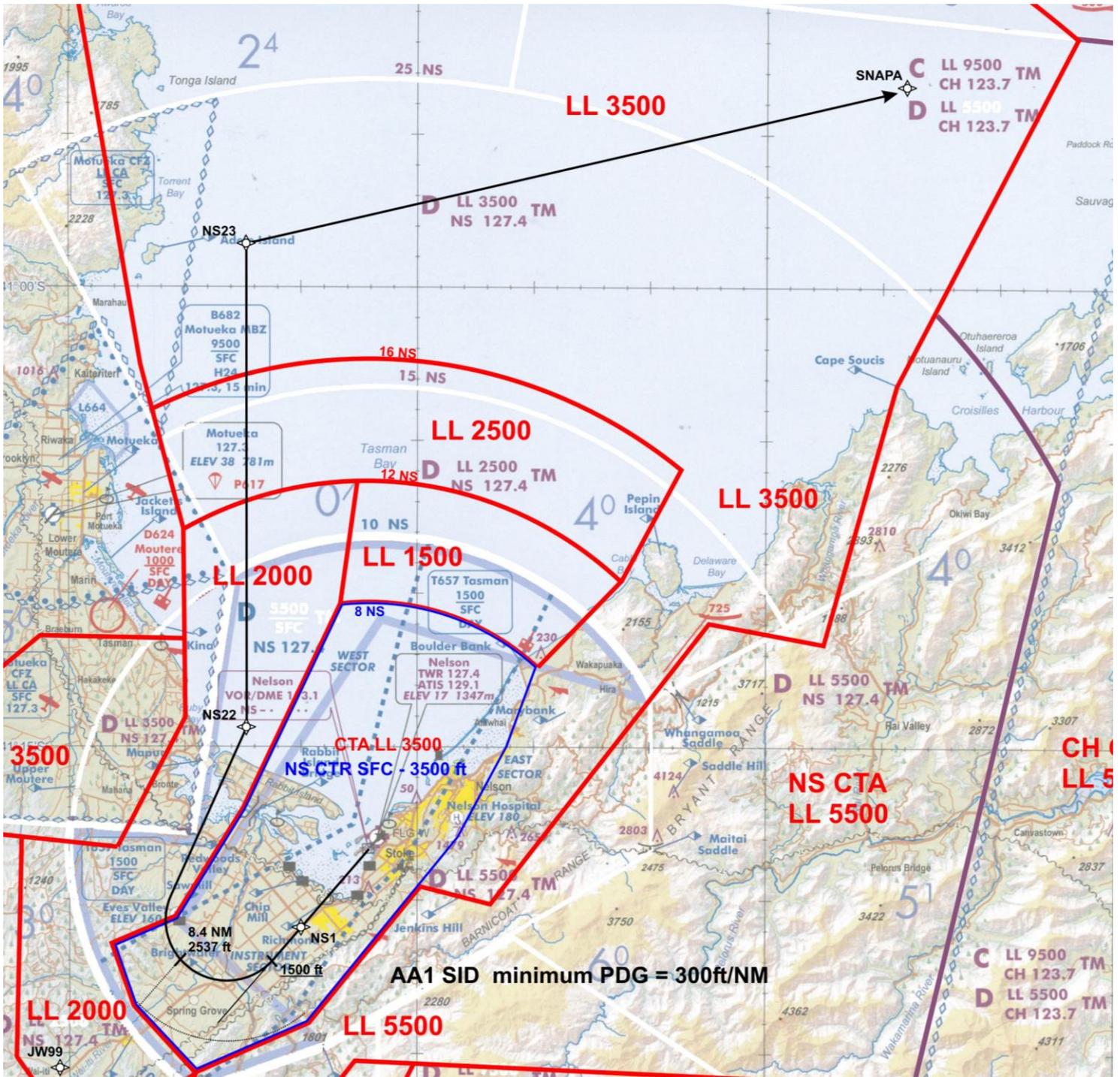


Diagram 9 Draft CTA.
Black line is the new PBN departure off RWY 20 to NZAA.

The draft CTA south of Nelson

The draft CTA to the south is depicted in Diagram 10 below. This CTA is more complex than ideal due to the high and undulating terrain to the south and the airspace design rule that the lower limit of CTA must be at least 700 ft above terrain. Attempts to simplify the design by expanding a particular CTA were often prevented by a high point in the terrain that would result in the CTA be less than the required 700 ft above the terrain. Potentially, some of the CTA boundaries to the west-south-west of NS near Tapawera could be arcs from NS DME but these would result in some increase in CTA. The CTA boundary to the south near Inwoods Lookout ‘threads’ a fine line between providing the required airspace for containment of the IFR procedures (see Diagram 11), ensuring the CTA is at least 700 ft above the 5387 ft high terrain spot and providing as much class G airspace as practical for hang glider/paraglider operations from Inwoods Lookout launch site.

Airways is happy to work with operators and CAA to refine and simplify the boundaries where possible.

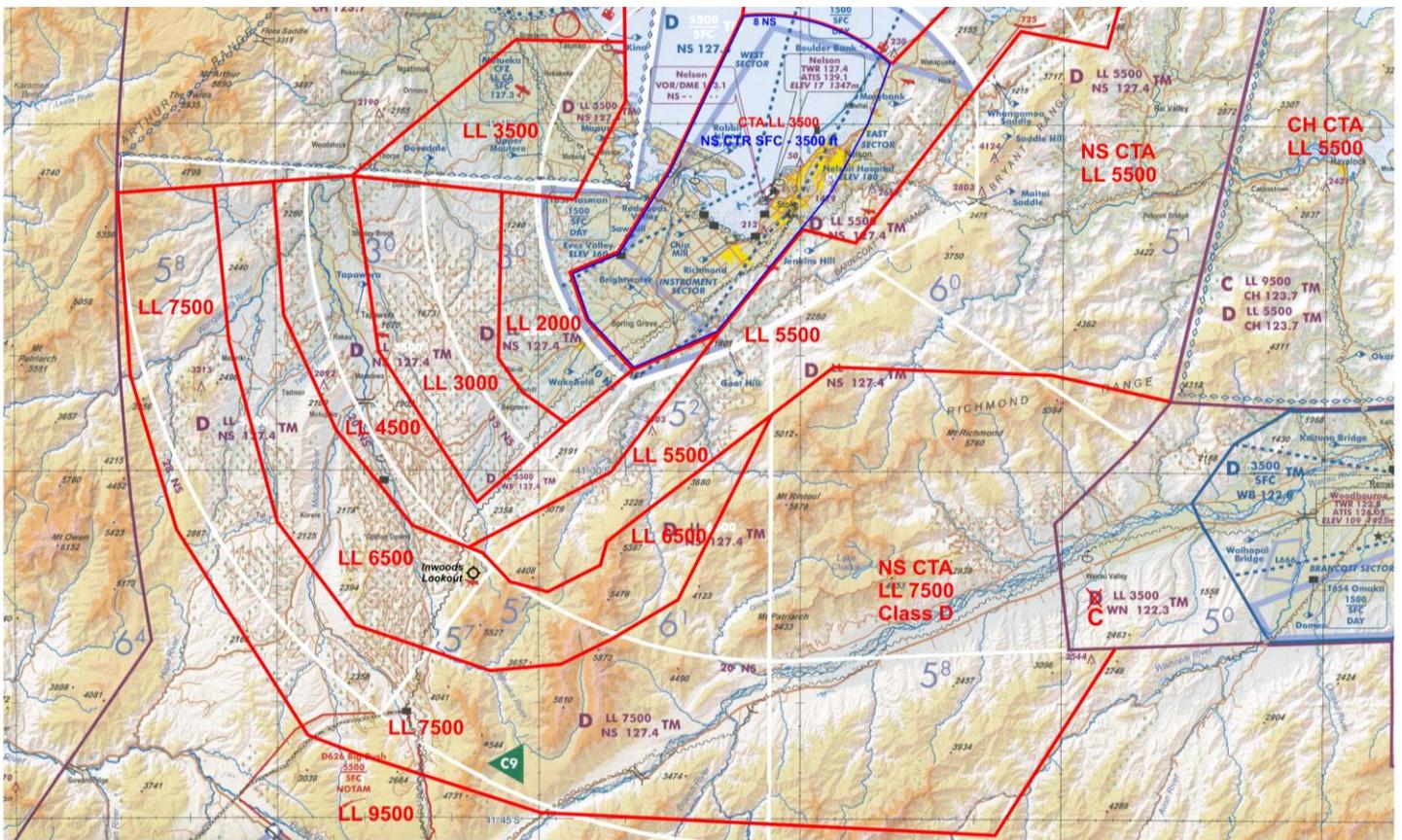


Diagram 10 Draft CTA to the south.
The hang gliding and paragliding launch site at Inwoods Lookout
about 21 NM south-west of Nelson is depicted

Arrivals from NZCH, NZWN and the West Coast are shown on Diagram 11 below. Distance and altitude checkmarks are shown along with the extent of the required 2 NM buffer near the checkpoint.

The CTA LL 4500 ft that wraps around the east of the 2000 ft and 3000 ft CTA is needed to contain the RNAV RWY 02 approach from QUAIL and the RWY 20 departure that turns left for NZWN.

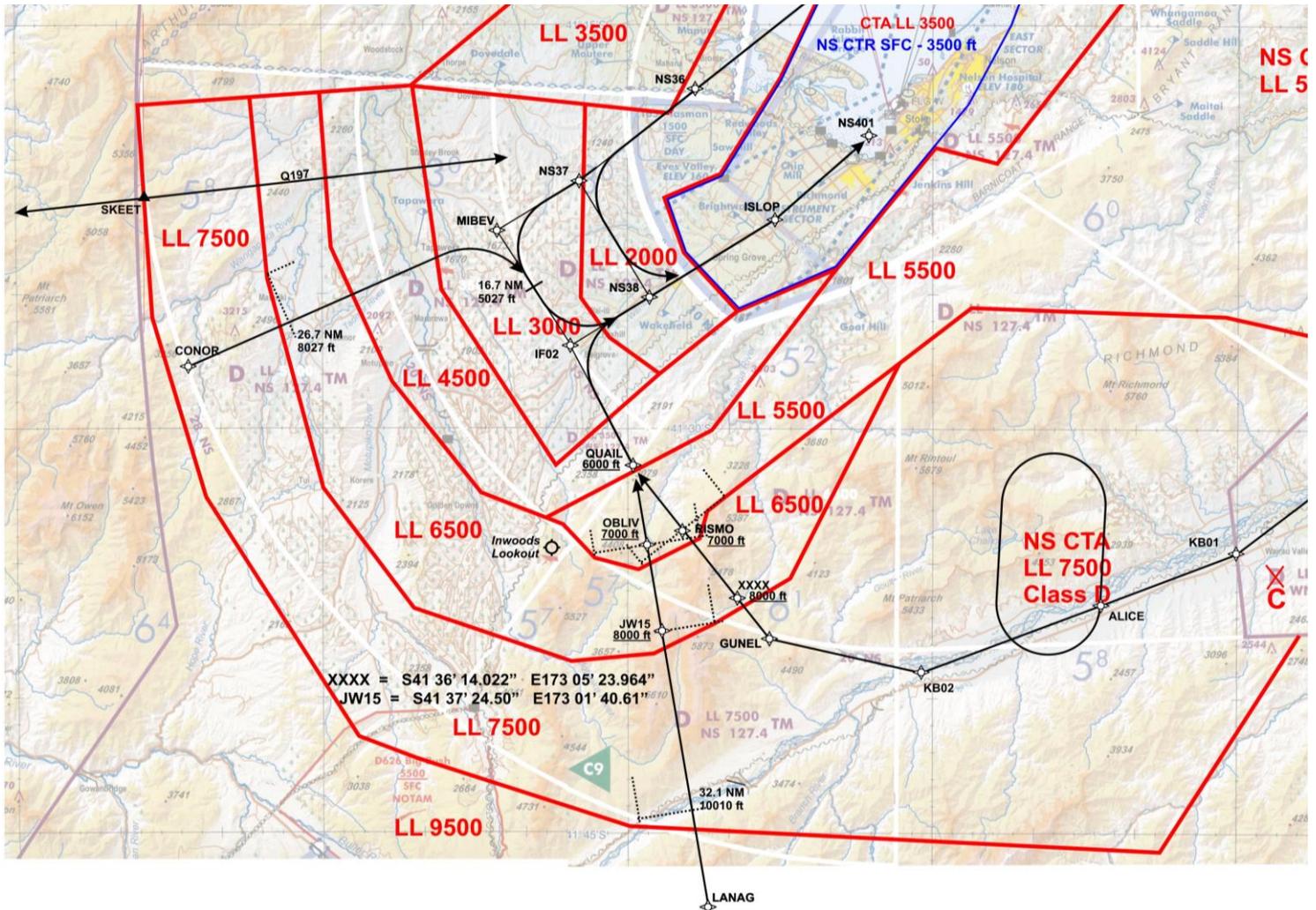


Diagram 11 Draft CTA to the south with arrivals from NZCH, NZWN and the West Coast along with the RNAV approach to RWY 02. The planned new 'ALICE' holding pattern on the RWY 02 arrival from the east is also depicted. The CTA LL 7500 ft is expanded south to correctly contain this new holding pattern.

Diagram 13 below depicts the RWY 20 departures to NZWN.

The WN departure to the south that turns left passing 4000 ft is depicted in two forms;

1. the black line is the nominal track when the aircraft climbs at the procedure's minimum gradient of 400 ft per NM (6.6%) to 7,000 ft;
2. the green line is the nominal track when the aircraft climbs at a steeper gradient of 570 ft per NM (9.4%) to 7000 ft.

The CTR and CTA are designed to contain that left-turning WN departure in both those climb gradient situations.

However, if an aircraft departing on this SID climbed steeper than 570 ft/NM (9.4%) to reach 4000 ft and turn left at NS1 or soon after, and then reduced climb gradient, airspace containment would not be assured (or is unlikely). To contain a departure profile such as that would require lowered CTA and possibly the CTR being moved eastward to about its current location - maybe a bit further. The Airways position is that such a climb profile is unlikely and our CTR/CTA design should not have to allow for that at the expense of increased CTR. We welcome input from operators and/or CAA if they see it differently and require the extended airspace to ensure the containment of such departure profiles.

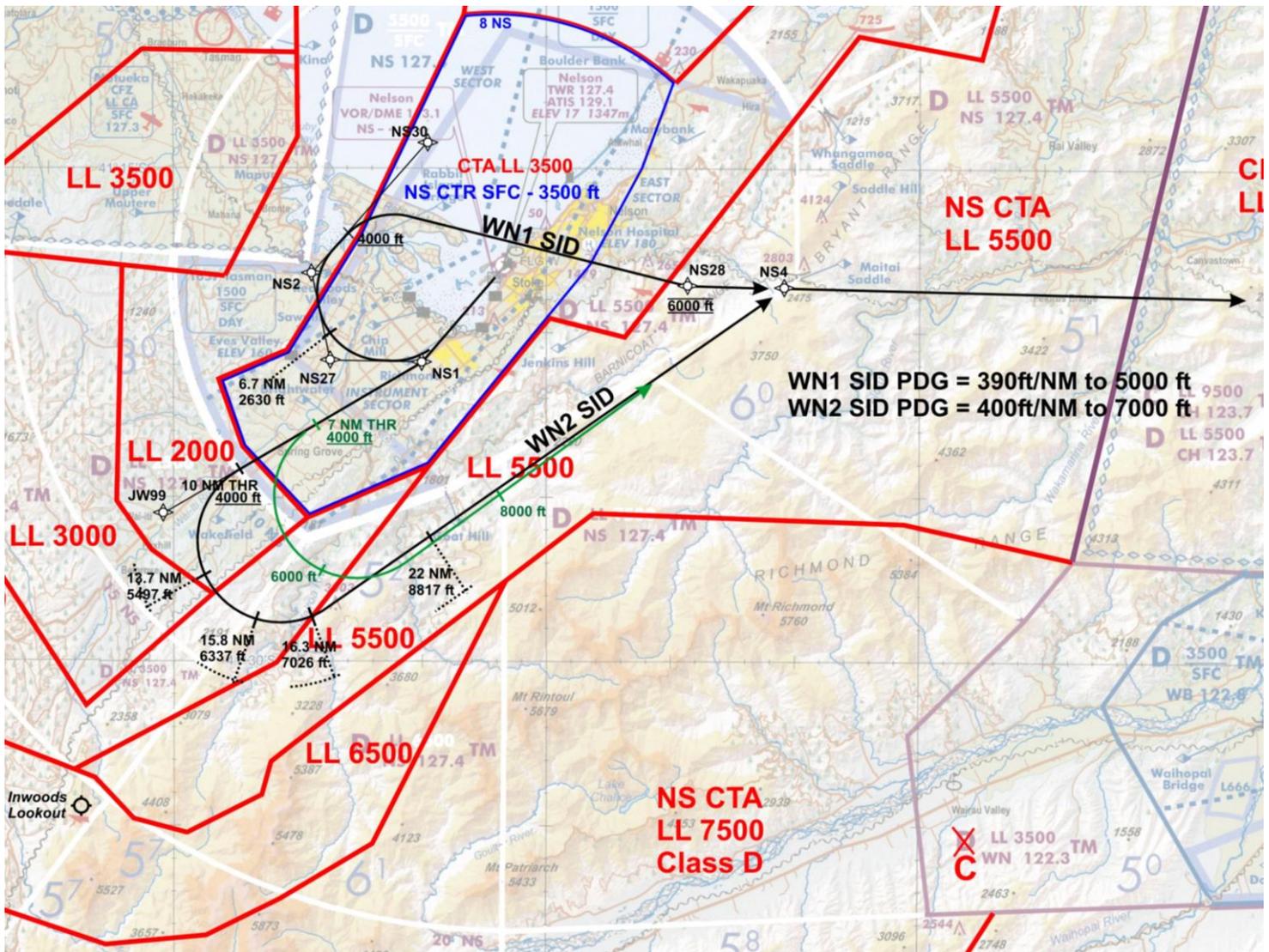


Diagram 13 Draft CTA to the south with RWY 20 departures to WN.

CTA and Inwoods Lookout launch site

Our understanding is that the Tasman Hang Gliding and Paragliding Club (THGPC) sometimes operate from a launch site at Inwoods Lookout about 21 NM south of NZNS.

Diagram 14 below is a Google Earth image depicting the Inwoods Lookout site along with the nearby draft CTA boundaries.

Part of the 6500 ft/4500 ft CTA boundary lies immediately north of Stock Road.

Diagrams 11 and 12 depict the nearby instrument procedures to/from Nelson. These show that there is minimal, if any, room to reduce the CTA and provide the THGPC with more uncontrolled airspace in this area.

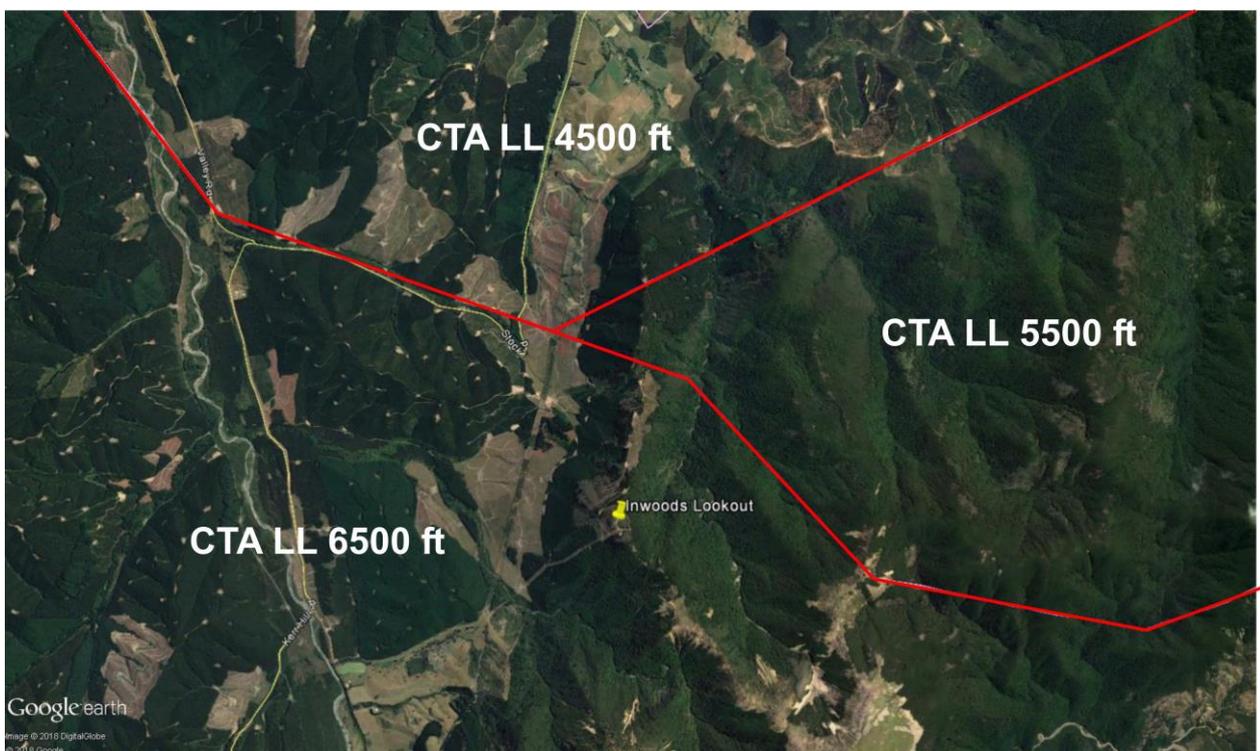


Diagram 14 Google Earth image depicting THGPC launch site at Inwoods Lookout with nearby draft CTA boundaries depicted in red.

Current Nelson IFPs to be retained that are contained:

VOR/DME C approach and missed approach except;

- 15 NS DME arc needs to be restricted to 251 radial and south/east.

VOR/DME A approach except;

- 15 NS DME arc needs to be restricted to 314 radial and east.
- missed approach needs to be amended to intercept 323 radial

RNAV (GNSS) RWY 02 approach except;

- amended missed approach to a new holding pattern

RNAV (GNSS) B approach except;

- missed approach needs to be amended to track via NS22 – new holding pattern

Cat A, B and C circling areas (out to 4.2 NM from thresholds) to the west of NZNS

SKEET TWO Arrival from SKEET eastwards

LANAG ONE Arrival

RWY 02 ZULU departure

RWY 02 XRAY departure

RWY 02 VICTOR departure

RWY 20 ZULU departure

RWY 20 XRAY departure

RWY 20 VICTOR departure except;

- climb gradient needs to be steepened to 5.5% until passing 2000 ft to clear proposed transit lane.

Nelson IFPs to be disestablished with PBN introduction

GUNEL ONE Arrival

NESTA TWO Arrival

DUMIK ONE Arrival

CONOR TWO Arrival

ATAPO TWO Arrival

ELMAX TWO Arrival

NELSON TWO Arrival

RILDO ONE Arrival

RWY 02 TANGO departure

RWY 02 PAPA departure

RWY 20 TANGO departure

RWY 20 PAPA departure

Nelson Visual Reporting Point (VRP) changes

Airways will be requesting some changes to visual reporting points but at this stage these have not been finalised.

Consequentials to Nelson requested changes

Airways has identified the following consequentials if the requested airspace is accepted and promulgated. There are likely to be more consequentials not identified by Airways.

1. B682 Motueka MBZ will need its south-eastern boundary moved westward slightly to align with the requested CTA boundary
2. Motueka CFZ boundaries reviewed by CAA and interested parties

Woodbourne CTA classification change

Separate to the requested Nelson airspace changes, Airways is requesting that the WB CTA 3500 ft to 9500 ft (NZA631), red highlighted in Diagram 15 below, is changed in classification from Class D to Class C.

This CTA block is controlled by WN Approach. All the CTA controlled by WN Approach around this particular CTA is Class C.

Changing this CTA block to Class C would enhance consistency of ATC service.

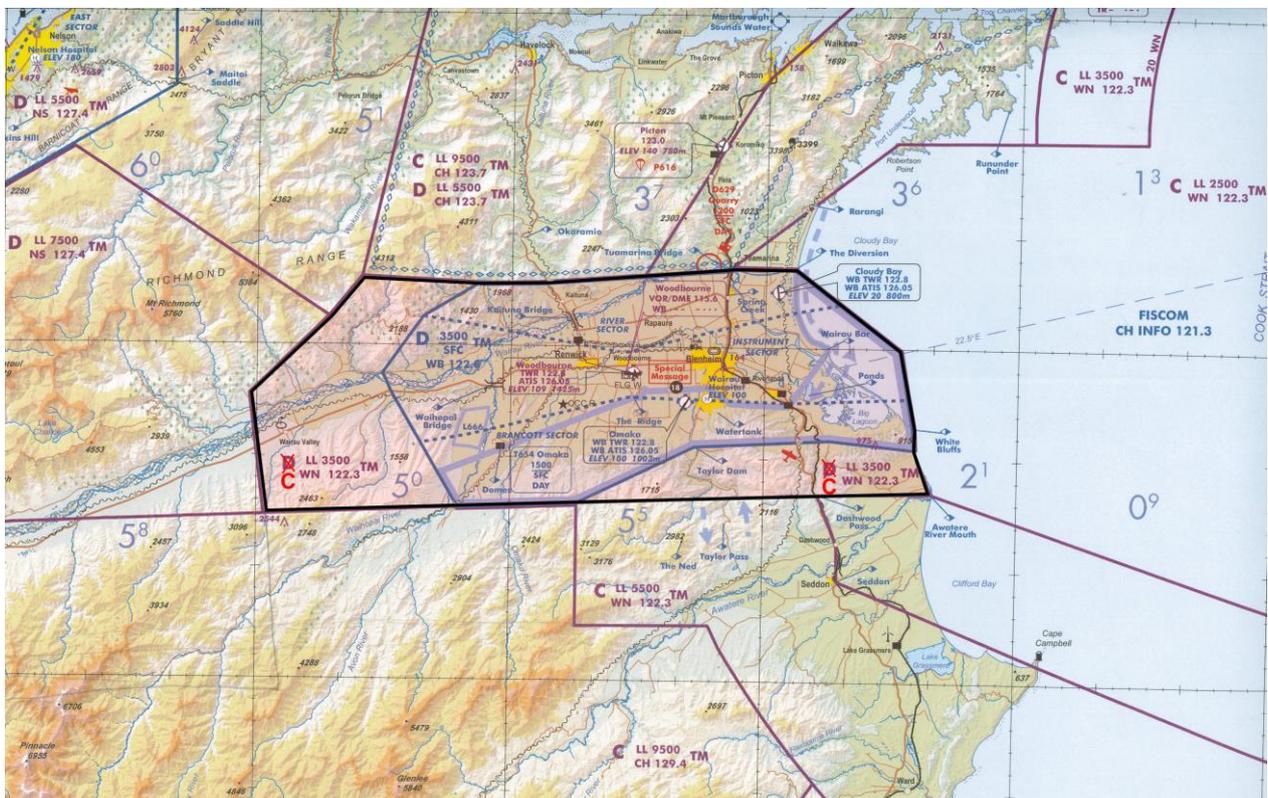


Diagram 15 The WB CTA that we are requesting classification change to Class C.