

QUALITY AVIATION CONSULTING

SAFETY BY DESIGN



AERONAUTICAL STUDY

WANAKA AIRPORT – AERODROME

DESIGN AND CERTIFICATION

REQUIREMENTS

PRIVATE AND CONFIDENTIAL

Final Report (Version 2)

Dated: 6th March 2023

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Glossary and Abbreviations

ACAS	Airborne Collision Avoidance System (also known as TCAS)
ADS-B	Automatic dependent surveillance broadcast
AFIS	Aerodrome Flight Information Service
AGL	Above Ground Level
AIP / AIPNZ	Aeronautical Information Publication (of New Zealand)
Airways	Airways Corporation of New Zealand
ALARP	As low as reasonably practicable
AMSL	Above Mean Sea Level
ARC	Aviation Related Concern
ATC	Air Traffic Control
ATS	Air Traffic Services
AWIB	Aerodrome and weather information broadcast
CAA	Civil Aviation Authority (of New Zealand)
CAR	Civil Aviation Rule
CFZ	Common Frequency Zone
CTA	Control Area
CTAF	Common traffic advisory frequency
CTR	Control Zone
DME	Distance measuring equipment
EMS	Emergency medical service
ESL	English as a second language
FIR	Flight Information Region
FIS	Flight Information Service
FISCOM	Flight Information Service Communications
FL	Flight level (hundreds of feet)
GAA	General Aviation Area
GAP	Good Aviation Practice (booklet)
GNSS	Global Navigation Satellite System
GPS	Global Positioning System H24 Hours: (i.e., permanent)
GPWS	Ground Proximity Warning System
HSWA	Health and Safety at Work Act 2015
ICAO	International Civil Aviation Organisation
IFR	Instrument Flight Rules
LFZ	Low Flying Zone
MBZ	Mandatory Broadcast Zone
NDB	Non-Directional Beacon
NOTAM	Notice to Airmen
NZALPA	NZ Airline Pilots Association
NZWK/ WKA	Wanaka Airport

PCBU	Person conducting a business or undertaking (HSWA)
PLA	Parachute Landing Area
PLZ	Parachute Landing Zone
PSR	Primary Surveillance Radar
QAC	Queenstown Airport Corporation
QLDC	Queenstown Lakes District Council
QNH	Altimeter sub-scale setting
RESA	Runway End Safety Area
RFS	Rescue Fire Service
RNAV	Area navigation
RNZAF	Royal New Zealand Air Force
RWY	Runway
SFARP	So far as is reasonably practicable
SFC	Surface
SSR	Secondary Surveillance Radar
TM	Transponder Mandatory Airspace
TWR	Aerodrome control tower
UNICOM	Universal Communication service
VFR	Visual Flight Rules
VMC	Visual meteorological conditions
VNC	Visual Navigation Chart
WFAEP	Wanaka Airport Aerodrome Emergency Plan
WFAOM	Wanaka Airport Operations Manual

EXECUTIVE SUMMARY

This Aeronautical Study was conducted, at the request of Wanaka Aerodrome and Queenstown Lakes District Council, to predominantly assess aerodrome layout and design, requirements for certification under Part 139, airspace issues in the areas surrounding Wanaka Aerodrome and whether any form of Air Traffic Management was warranted at Wanaka Aerodrome.

Due to the broad scope of the study, it was decided to produce two reports, that could target key issues more effectively. This report pertains to aerodrome design and aerodrome certification issues. The second report deals with airspace designation and consideration of any Air Traffic Management that may be deemed necessary. Both reports should be read in conjunction.

The outcome of this report was that we recommend that Wanaka Aerodrome apply for certification under Part 139 as a Qualifying Aerodrome. We have also raised 14 additional recommendations that would enhance safety and efficiency at Wanaka Aerodrome regarding aerodrome layout and design. These are detailed in Appendix 1.

Future development of Wanaka Aerodrome, in line with the last master plan (2008), was also considered during this study. There was some indication that it is not active/ currently being followed.

1 OBJECTIVE

Wanaka Airport is owned by the Queenstown Lakes District Council (QLDC) and has been managed by Queenstown Airport Corporation (QAC) via a Management Services Agreement since April 2021. For the 3-year period prior to this, the aerodrome was leased by QAC from QLDC on a long-term lease.

It is designated as a non-certificated, unattended aerodrome within uncontrolled Class G airspace and a Common Frequency Zone (CFZ).

Prior to the 2020 Covid-19 global pandemic, annual aircraft movements were approximately 62,000 p.a., with a reduction in movements over the winter months. Current aircraft movements are approximately 34,000 p.a.

Due to the large traffic movements and complexity of aviation types, based on an operational safety and risk assessment and in consultation with airport users, in 2019 QAC applied to the CAA to change the airspace designation to an MBZ. This application was declined by the CAA noting that further consideration to a change in designation would not be undertaken until ‘the proposal is developed to a more mature state in line with future airport strategies’.

Further discussions with the CAA, have indicated that an Aeronautical Study would be beneficial in providing a development plan for airspace management at Wanaka Airport and further consideration for a change in designation. We were advised that QLDC will provide direction about future airport strategies in 2023.

In November 2020, Sounds Air began a daily scheduled passenger service between Wanaka and Christchurch utilising a Pilatus PC12 with 9 passenger seats. Over the last 18 months the schedule has increased from 20 movements per week to 28 movements per week at its peak. Sounds Air continue to adjust their schedule to manage the impacts of Covid-19 and the annual ‘inversion’ weather patterns that can cause disruptions during May and June but are looking to increase their schedule further for the summer months.

With the introduction of the regular passenger service, along with the current and pre-Covid traffic density, the CAA have reviewed the certification status of Wanaka Airport and determined that an Aeronautical Study needs to be completed as per CAR Part 139.21 (b)(1)(i).

With the risk factors around aircraft movement density and frequency influencing both airspace and aerodrome management, the QLDC wish to undertake an Aeronautical Study that reviews both aspects and considers the holistic view of aeronautical and operational safety and risk management at Wanaka Airport.

Due to the broad scope of the study, it was decided to produce two reports, that could target key issues more effectively. This report pertains to aerodrome design and aerodrome certification issues. The second report deals with airspace designation and consideration of any Air Traffic Management that may be deemed necessary.

2 CONTEXT

It should be noted that the 2008 Wanaka Airport Master Plan is the most recent master plan available for Wanaka Airport¹. In 2018 QAC conducted various discussions with the Wanaka community to gain feedback on the community's wishes for airport development to inform a master planning project starting in 2019.

This process was put on hold by QLDC in 2021.

This Aeronautical Study is limited to aerodrome design requirements pertaining to the scheduled operation of turboprop aircraft (Code 3C) with a seating capacity of up to 90 seats. The airport development required to accommodate larger turbo-prop aircraft would include runway extensions, provision of RESA and construction of a terminal building. Due to the many significant steps needed to reach that point, together with the likely time before a decision is made on any such development, the focus of this report is on the certification level appropriate to scheduled operation of the Pilatus PC12 aircraft (or similar) with a modest increase in daily flights.

¹ Wanaka Airport Master Plan, Revision 2.41, dated 11 September 2008.

3 PRELIMINARIES

3.1 SFARP APPROACH

This study has been conducted following the “So Far As is Reasonably Practicable” (SFARP) approach, as is prescribed in the Health and Safety at Work Act (HSWA) and referred to in the Advisory Circular (AC) relating to Safety Management (AC 100-1, Section 2.3.3). This differs from the “As Low As is Reasonably Practicable” (ALARP) approach that is detailed in the AC “Aeronautical Studies for Aerodrome Operators”. However, recent Aeronautical Studies approved by the CAA have accepted this approach, and we believe that this better covers PCBU obligations for safety under the Health and Safety at Work Act (HSWA) as well as CAA requirements under Part 139.

The methodology included consultation with aircraft operators, Wanaka Airport operations personnel and other interested parties (“aviation stakeholders”). Generative interviews were conducted with the key aviation stakeholders to identify credible critical risks and any practical precautions that could be introduced.

The outcomes of the generative interviews are described in section 5.

3.2 REFERENCE DOCUMENTS

- Proposal for Aeronautical Study dated 1st June 2022
- CAR Part 91, Amendment 34, 1st December 2021
- CAR Part 139, Amendment 14, 1st December 2020
- CAR Part 172, Amendment 15, 8th February 2021
- CAA AC139-6
- AIPNZ
- NZWF Safety and Operations Meetings minutes
- NZWF website.
- Wanaka Airport Master Plan, version 2.41, dated 11 September 2008
- Wanaka Aerodrome Operations Manual (draft)

3.3 SCOPE

The following scope for the aeronautical study has been defined in accordance with the Proposal for Aeronautical Study Document dated 10th May 2022.

3.3.1 SCOPE

We would be gathering information that would be the basis for which a long-term aerodrome design and certification plan for the aerodrome could be developed. This would include but not be limited to:

- An assessment of existing aerodrome infrastructure,
- A gap analysis between the current operating conditions and the requirements for certification as a qualifying aerodrome operator as per CAR Part 139 including certification requirements, operating requirements, and aerodrome security,
- An assessment of any proposed changes to existing aerodrome infrastructure ensuring any new aerodrome infrastructure provides a safe and efficient operational environment for aerodrome users,
- Consideration of the requirement to provide RESA acceptable to the Director if regular passenger air transport services (RPT) with aircraft having a certificated seating capacity of more than 30 passengers commences,
- An assessment of the applicable Civil Aviation Rules to ensure operations at the aerodrome remain compliant throughout,
- Meaningful consultation with Users and Stakeholders.

4 BACKGROUND

4.1 WANAKA AIRPORT OVERVIEW

Wanaka Airport (NZWF, or WKA) is a non-certificated aerodrome. It is managed on a day-to-day basis by the Airport Operations Manager, assisted by an Operations Coordinator. However, due to organisational changes within QAC, we understand that this will be changing, with the current Airport Operations Manager taking up a role in QAC. The Operations Coordinator will become a Duty Manager, with a second one to be employed, both employed by QAC.

The airport is approximately 5nm east-southeast of the Wanaka township at 1142ft AMSL. Its main runway is bounded by a road at the south-eastern end, but there is sufficient available land to the north-west for the runway to be extended to potentially 1700m in length allowing for 240m RESA at each end.²

Operations in and around NZWF include:

- a) Scheduled turboprop air transport operations (Sounds Air),
- b) Commercial parachuting operations,
- c) Commercial fixed wing tourism, general charter activity and flight training,
- d) Commercial helicopter activity including tourism, EMS flights, agricultural activity, flight training and general charter and commercial activity,
- e) Extensive paragliding activity nearby,
- f) Military activity,
- g) Private flying, both fixed wing (including microlight) and helicopter,
- h) Occasional visiting business jets typically seating 10 passengers or less,
- i) Infrequent training aircraft from other aerodromes, both VFR and IFR,
- j) Infrequent hot air balloon activity, but they are radio equipped,
- k) Airspace transiting glider activity,
- l) On field maintenance facilities.

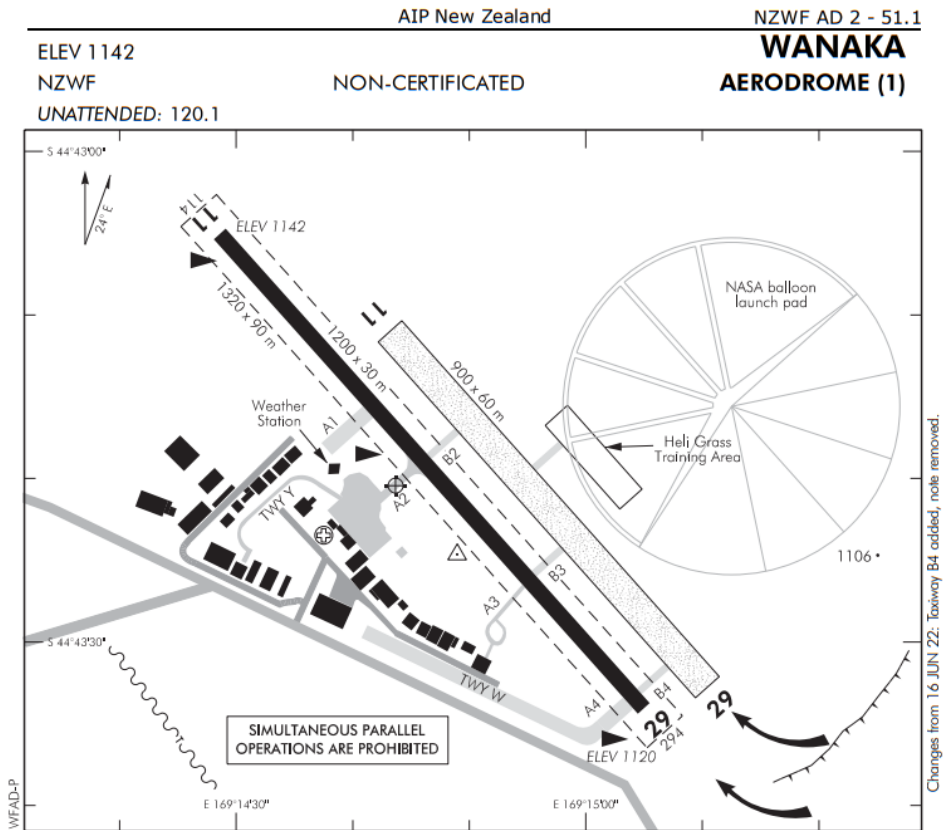
It also hosts a biennial Warbirds Air show, and an annual NASA Space Balloon launch programme.

² Refer Wanaka Airport Master Plan 2008 Appendix B which shows a runway extension of approximately 500m north-west. An extension to 1700m on the current runway alignment is provided for in the QLDC Operative District Plan Designations 64 and 65.

4.2 AERODROME CONFIGURATION

Diagram 1 below shows the aerodrome layout.

Diagram 1: Aerodrome Layout



1. **CAUTION:** Commercial skydiving operations (from altitudes up to 17,000 ft) are in regular operation NE of the aerodrome circuit. Skydiving activity is broadcast on 120.1 MHz.
2. Simultaneous parallel operations are prohibited. Aircraft are not to land or take-off on paved RWY 11/29 or grass RWY 11/29, FATO or the helicopter grass training area while aircraft are landing or taking off on a parallel runway/FATO or the helicopter grass training area.
3. Circuit: RWY 11 and Grass RWY 11 — Left hand
RWY 29 and Grass RWY 29 — Right hand
4. Approaches, landings, take-offs and departures for all aircraft **including helicopters** must be via the runways and normal circuit patterns. Helicopters must enter or exit the runway via a taxiway or the helicopter FATO.
5. Intensive helicopter training operations on and adjacent to aerodrome.
6. Grass RWY 11/29 has non-prepared surface suitable for light aircraft only.
7. **CAUTION:** Light aircraft on opposite THR are not always visible to each other due to hump in RWY.

(continued)

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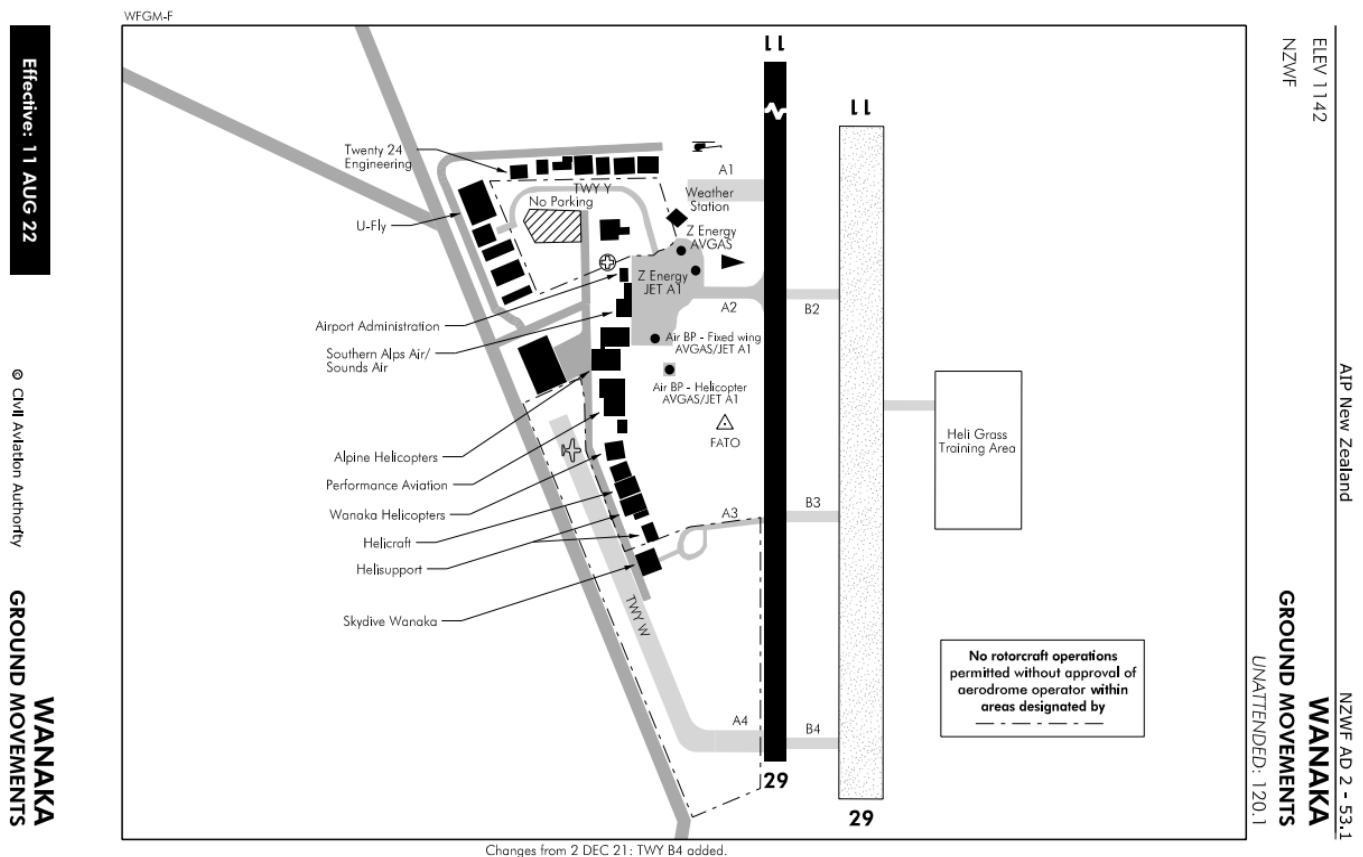
**WANAKA
AERODROME (1)**

The sealed main runway, RWY 11/29, is 1,200m long by 30m wide. The runway strip extends to the dimensions of 1,320m long by 90m wide, centred on the runway centreline. A parallel grass runway, Grass RWY 11/29, lies on the north-eastern side of the main runway and is 900m long by 60m wide. There is also a grass training area used by rotorcraft, parallel to and north-east of Grass 11/29. The training area, known as “Heli Grass,” extends over a portion of the NASA balloon launch pad.

Circuits on Seal RWY 11 and Grass RWY 11 are flown in the default left-hand direction, while circuits on Seal RWY 29 and Grass RWY 29 are flown in the right-hand direction. This results in circuit traffic remaining on the north-eastern side of the runways, regardless of which runway direction is in use.

Simultaneous operations with any combination of the parallel sealed and grass runways, the Heli Grass training area, and the FATO are not permitted.

Diagram 2: Apron and Taxiway Detail



The sealed main apron is located on the southern side of Seal RWY 11/29. A sealed taxiway with Hold Point A2 connects the apron to the main runway. Z Energy AVGAS and JET A1 pumps are located on the western end of the apron, and Air BP AVGAS and Jet A1 pumps are located at and near the eastern end.

Taxiway Y allows access to the hangars west of the main apron, where no rotorcraft operations are permitted without prior approval from QAC. Hangars east of the main apron are accessed via taxiing across the grass, although the Skydive Wanaka hangar is connected to the main runway via a sealed taxiway with Hold Point A3.

Taxiway W, a grass taxiway, runs between State Highway 6 and the hangars east of the main apron and joins the main runway at the RWY 29 threshold. No rotorcraft operations are permitted on Taxiway W, the taxiway to the Skydive Wanaka hangar, and all of the grass areas in between without prior approval from the aerodrome operator.

4.3 REVIEW OF RUNWAY EXTENSION OPTION FROM WANAKA AIRPORT MASTER PLAN 2008.

The 2008 master plan forecast:³

- A gradual increase in Christchurch scheduled services using the Beech 1900D aircraft.
- Further increase in scheduled services capacity from about Yr.2013 – 2017 to/from Christchurch and (perhaps) Wellington with the use of larger Dash 8 (50 pax) and ATR (66 pax).
- The introduction in about Yr.2020 of domestic jet aircraft scheduled flights to/from Christchurch (and possibly Wellington and Auckland) using the B737-300 or similar aircraft.
- The possible replacement of ATR 72 with Dash 8 Q400 aircraft in Yr.2026.

In the event, Air NZ withdrew its B1900 services and operations by larger aircraft never eventuated as air services from Queenstown airport expanded rapidly to include more frequent and reliable jet services.

³ 2008 Master Plan para 6.5

In 2008 total annual movements were projected to be 57,000 by 2026 including 2,400 scheduled services by B737 and ATR72 aircraft in approximately equal numbers.⁴ Given that the current annual movements, reduced by Covid 19 restrictions, are 34,000 and movements have been as high as 62,000 pre-Covid, the 2008 57,000 movements projection for 2026 may prove to be reasonably accurate.⁵

The 2008 plan went on to project 70,500 annual movements by 2036, including 6,000 737 and ATR movements. This projection still appears viable being only 7% more than that achieved pre-Covid, but again without jet services. In that timeframe services by a turbo-prop aircraft larger than the PC12 are possible and should at least be provided for with regards to runway and associated operational area development.

It is outside the scope of this Aeronautical Study to develop a runway extension plan. We consider the 2008 Master Plan “Table 3 Baseline extension” of 480m north-west, shown in Diagram 3, to be the maximum likely to be required to accommodate larger turboprops.⁶ However, under Part 139, 240m RESA would be required at both runway ends, the 2008 proposal only having 90m for landing undershoot at the 29 end.

We note the current Wanaka Airport Designation in the Operative District Plan provides for a 550m extension at the 11 (north-west) runway end.⁷

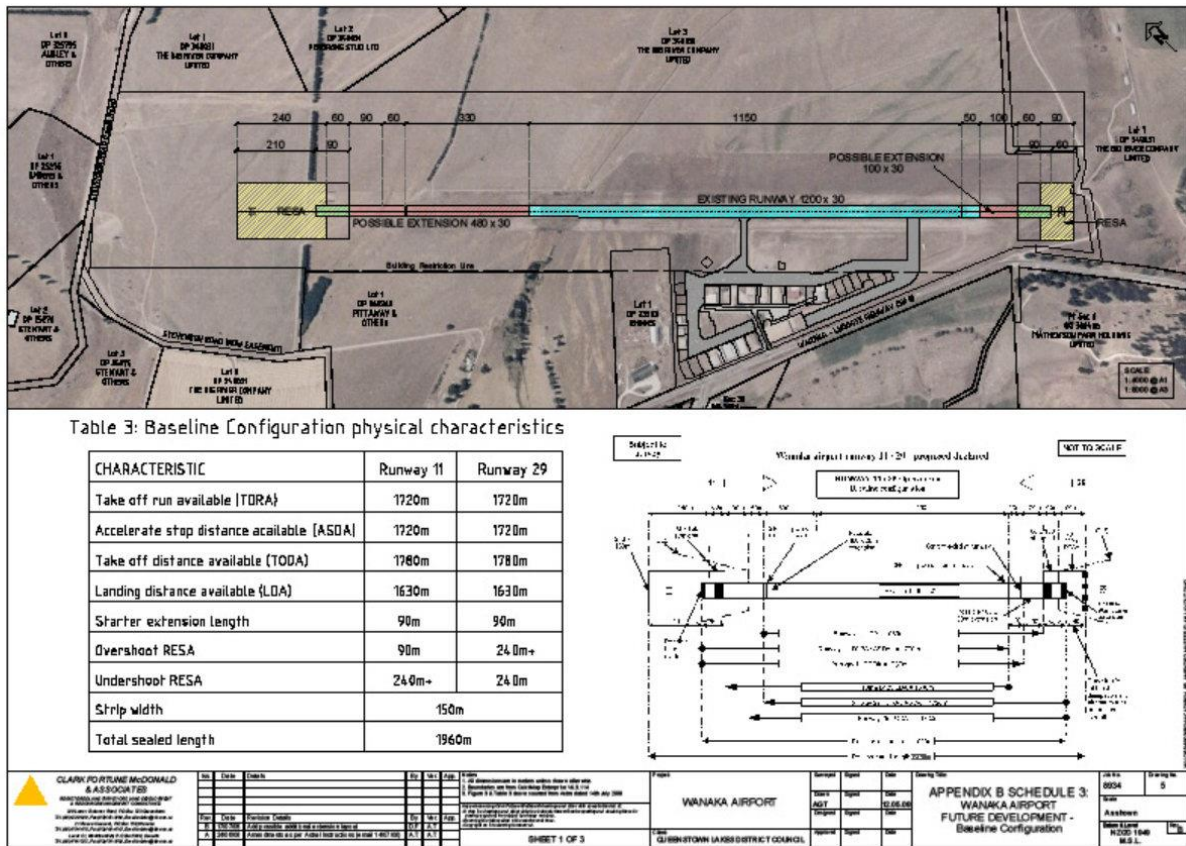
⁴ 2008 Master Plan Table 6-4

⁵ Albeit with circa 2,000 Pilatus PC12 schedule movements instead of the 2,400 scheduled 737/ATR movements

⁶ 2008 Master Plan Appendix B Schedule 3

⁷ Operative District Plan as at Sep 2022, Appendix A section E.1(c)

Diagram 3: 2008 Master Plan Baseline Extended Runway Layout



4.4 RULE PART 139 QUALIFYING AERODROME

The intent of Qualifying Aerodrome certification is to provide a basic regulatory structure for the safe operation of an airport.

It is essential to note that a Qualifying Aerodrome certification only permits scheduled operations of aircraft with 30 or fewer passenger seats.

This includes the existing PC12 services and, runway length permitting, aircraft up to the size of the 19-seat Metroliner operated by Air Chathams.⁸ As such it focuses on the airport having:

- a) Competent management and staff and adequate resources, including financial authority

⁸ The runway length requirements for the Metro have not been established as part of this study, but we note that its current operations are mainly from Whakatane Airport which has a 1280m long runway (compared to NZWF’s 1200m) and is at sea level (compared to 1130ft at NZWF).

- b) Documented processes and systems including safety management that are effective and adhered to
- c) Operational infrastructure that meets a suitable standard

Effective monitoring and reporting systems. The following are requirements for a Qualifying Aerodrome specified under Part 139:

4.4.1 Subpart AA – Determination for Qualifying Aerodrome

This deals with the requirements for an Aeronautical Study to identify and assess aviation risks that exist at the aerodrome. The subpart lists various trigger points for the study to be done, or the Director can simply require it to be done. After reviewing the Aeronautical Study, the Director can require the aerodrome operator to apply to certificate the aerodrome either as a Qualifying Aerodrome or a fully certificated aerodrome.

The risks identified in the Aeronautical Study will form the basis of changes required to the aerodrome’s “physical characteristics”, its operations and its policies and procedures required to achieve certification.⁹

4.4.2 Subpart F -UNICOM and AWIB

This subpart sets out the standards required for Universal Communications (UNICOM) and Aviation Weather Information Broadcast (AWIB) if provided at the airport. Any requirement for these services would arise out of the Aeronautical Study specified in Subpart AA.

4.4.3 Subpart G

This subpart sets out the entry requirements for a Qualifying Aerodrome to become certificated, as set out below:

- a) Personnel requirements

Rule 139.401 requires the aerodrome to have competent “senior persons” nominated as the Chief Executive (CE) and Airport Manager. The CE must have the authority to ensure all activities required to achieve and maintain certification can be financed and is ultimately responsible for regulatory compliance. The Airport Manager must be responsible to the CE

⁹ “Physical characteristics” refers to the design of the aerodromes runways, runway strips, RESA, aprons, lighting systems, markings and signage, obstacle limitation surfaces etc.

and have day to day responsibility for compliance and the airport's safety management system (SMS).

The CE and Airport Manager can be the same person.

Sufficient additional staff as may be required to support compliance must also be engaged. Procedures for assessing and maintaining the competence of all required staff must be established.

b) Limitations

Rule 139.403 requires any limitations on the use of the aerodrome necessary for the safety of aircraft operations to be established by the aerodrome operator. This could include for example, the maximum size and weight of aircraft able to use the facility, restrictions on hours of operations and any types of operation specifically excluded due to incompatibility with established operations.¹⁰

c) Public protection

Rule 139.405 requires the aerodrome to have appropriate safeguards to; prevent animals interfering with aircraft operations, deter unauthorised persons and vehicles from accessing operational areas and to reasonably protect people and property from aircraft operations.

At non-security designated airports, it is generally adequate to ensure secure fencing around the operational area perimeter, being 1300mm high robust mesh or paling fencing in areas where the general public have access and 5 wire stock proof fencing on rural boundaries. Liberal use of CAA "No Trespassing" signage is required.

Airside access points should be kept to a minimum and be secured e.g., by passcode or swipe card. Barrier arms without vertical palings are problematic as they do not prevent access by animals or small children or deter adults.

d) Notification of data and information

Rule 139.407 requires procedures to be established to notify the Aeronautical Information service, provided by Airways Corporation via the "Aeronautical Information Publication" (AIP)

¹⁰ Typically this could be ballooning, gliding and parachute landings on busy fixed wing and helicopter aerodromes.

and “Notices to Airmen” (NOTAM), of any changes to aerodrome operational data which need to be advised to pilots. These would arise out of daily inspections, pilot reports and routine surveys of, for example, vegetation growth.

e) Safety management

Rule 139.409 requires the airport to have an SMS, appropriate to the size of its operations, that meets the requirements of CAR100.3. which includes:

- A safety policy acceptable to the CAA
- A process which identifies hazards and evaluates and manages associated risks
- A hazard, incident and accident reporting and follow-up corrective action system
- Goals for aviation safety improvement are set and measured
- A quality assurance system that performs internal audits and reviews of the SMS
- Training staff for competency in safety management
- Documentation of all policies and processes
- Movements data

Rule 139.411 requires the airport to collect its movements and report them to the Director of CAA every three months

f) Work on aerodromes

Rule 139.413 requires the aerodrome to have procedures for ensuring any works on the aerodrome to not endanger aircraft operations. This could include standard procedures when, for example, grass cutting is occurring in operational areas or “one-off” Method of Works Plans (MOWP) for airside construction projects.

g) Documentation

Rule 139.415 requires the aerodrome to hold copies of relevant documentation (e.g. operating manuals) and ensure they are kept up to date and obsolete documents are removed.

h) Exposition

Rule 139.417 requires the aerodrome to provide the Director a copy of its “Exposition” being the collection of manuals that define the organisation and its methods of compliance with

aviation regulatory requirements. This includes a statement signed by the CE confirming that the Exposition does this and that it will be complied with at all times.

This rule lists specific areas for which the Exposition, which must be acceptable to the Director, must include compliance processes, namely:

- All SMS documentation
- Names, titles, duties and responsibilities of the senior persons (CE and Airport Manager), and an organisational chart. Rule 139.455 requires the Director to approve any proposed changes to senior persons prior to the change.
- Aerodrome limitations
- Public protection safeguards
- Information identifying the lines of safety responsibility
- Procedures for notification of aerodrome data, movements reporting, works on the aerodrome, management and control of documentation including the Exposition

The rule also lists a number of areas in which risks requiring management may have been identified in the Aeronautical Study. These include, but are not limited to any shortfalls in the aerodrome's:

- Physical characteristics
- Emergency plan
- Rescue and firefighting
- Wildlife management (primarily bird control)
- Maintenance, including visual navigation aids and their checking and protection of navigation aids
- Air traffic services (Air Traffic Control (ATC) or Aerodrome Flight Information Service (AFIS))
- Apron management services and control of ground vehicles
- Aerodrome condition inspection and reporting

4.4.4 Subpart H - Operating requirements for qualifying aerodromes

This subpart sets out the on-going requirements after Qualifying Aerodrome certification is obtained, as listed below:

- a) Continued compliance

Rule 139.451 specifies requirements for availability of the Exposition to airport staff, and compliance with its procedures. It also specifies that the Director must be notified of any changes to the Airport's contact details.

b) Unsafe conditions

Rule 139.453 requires the airport to have procedures in place to ensure aircraft operations are restricted or stopped completely in the event of any unsafe condition. This could include for example runway flooding or significant damage, drone operations or essential construction activity.

c) Aeronautical study

Rule 139.457 requires the airport operator to monitor operations and conduct a further aeronautical study for any significant change that may affect airport operations including; significant increases in airport traffic volumes (for example the establishment of a new flight school), a change in the type of operations, for example ex-military jets regularly using the traffic circuit, significant changes to the airports' physical characteristics (for example opening a new runway or taxiway), a significant increase in the number of accidents or incidents in the airport's area.

A list of "trigger points" in terms of numbers and types of movements for which an Aeronautical Study must be prepared are included in this rule. For NZWF the next trigger points would be:

- When total annual movements are forecast to exceed 40,000 for three consecutive years (currently at 34,000); or
- Annual IFR movements are forecast to exceed 7,500 for three consecutive years (currently estimated to be 2000).

It is important to note that where practicable the Aeronautical Study needs to be prepared and any changes arising out of it be implemented before the anticipated significant change occurs i.e., the airport operator must be proactive. A copy of the study must be provided to the Director and after reviewing it, the Director may impose conditions or limitations on the airport in relation to the proposed change.

An example of a significant change could be the temporary operation of an RNZAF tented camp at the airport which significantly increases ground movements and circuit traffic.

d) Physical characteristics and design standards

Appendices A to E of CAR 139 list a number of items that, if required at an aerodrome, must be of a certain standard. For example, if the airport has lighting for night operations, then it must meet the requirements of Appendix E for lights and beacons and Appendix F for electrical systems. Other relevant standards are contained in AC139-6.

This is to ensure that optional items, such as night lighting, if provided, must meet an acceptable aviation standard. Essential items such as runways, strips, taxiways, obstacle limitation surfaces, runway, apron and taxiway paint marking and signage, and identification of restricted areas must conform with the standards in the Appendices or AC139-6.¹¹

4.5 RULE PART 139 CERTIFICATION REQUIREMENTS

In addition to the above requirements, the following additional requirements are required for a Certificated Aerodrome under Part 139. Certification would be required to allow scheduled air services with aircraft of greater than 30 passenger seats.

The certification, operation, and security requirements for fully certificated aerodromes, which usually have operations by much larger aircraft with an associated higher level of public risk, are more stringent than for Qualifying Aerodromes. One of the main differences in regulatory approach between the two certification levels is that under the Qualifying Aerodrome certification there is reliance on the aeronautical study to identify areas of risk that need to be addressed whereas under full certification the requirements are much more prescriptive and apply irrespective of the level of risk that may exist.

This makes a Qualifying Aerodrome certification far more “light handed” for smaller aerodromes with limited resources and only small capacity scheduled aircraft operating. In that regard it is, in our opinion, much better suited to an aerodrome with the type of operations NZWF has, that is over 95% GA movements and with a low number of scheduled movements by aircraft with 9 passenger seats.¹²

¹¹ There is provision for an alternative mean of compliance from a specific Rule requirement if it clearly provides an equivalent level of safety. This would be through a formal “exemption” granted by the Director which would be for a maximum of five years.

¹² Analysis of the 2021 movements showed approximately 97% were non-scheduled.

Other trigger points as detailed in Rule Part 139.131 (e.g., more than 7,500 IFR movements for more than 100,000 total movements) would require further aeronautical studies, which may prompt full certification.

That said, QAC as the nominated aerodrome operator, has the additional full certification systems and resources in place at NZQN to be able to cover the full certification at NZWF at a marginal cost.

The requirements for full certification are not described in detail as that is outside the scope of this study, but the following provides a summary.

4.5.1 Subpart B – Certification requirements

a) Aerodrome design

Rule 139.51 sets out specific requirements for aerodrome design for physical characteristics (including a requirement for RESA), obstacle limitation surfaces, visual aids, equipment and installations, that require compliance with the relevant Part 139 appendices. However, under 139.51(e)(2) these (including RESA) only apply if the aerodrome has regular operations of aircraft with more than 30 seats.

b) Emergency planning requirements

Rule 139.57 requires the aerodrome to have an emergency plan which must, to the extent practicable, be developed in conjunction with all relevant agencies and personnel.

c) Aerodrome rescue and firefighting

Rules 139.59 to 139.67(A) prescribe the requirements for ARFF. As the PC12 aircraft has less than 30 passenger seats, under Rules 139.5(aa)(2) and 139.59(c)(3) it does not require provision of ARFF. Operations of ATR72 aircraft, if more than 700 movements in the busiest consecutive three months of any 12 month period, would require ARFF at Category 4.

d) Public protection

Rule 139.69 prescribes specific requirements for fencing of operational areas, especially adjacent to areas where the public has vehicle or pedestrian access.

e) Wildlife hazard management

If any wildlife presents a hazard to aircraft operations, Rule 139.71 requires an environmental management programme for minimising or eliminating the wildlife hazard to be established. This appears to be a fairly low threshold, whereas a Qualifying Aerodrome only needs to include wildlife risk management requirements and procedures in its exposition if the aeronautical study identifies wildlife as a particular hazard.

f) Aerodrome certification exposition

Rule 139.77 requires a fully certificated aerodrome to have a much more comprehensive exposition detailing how it will comply with the additional requirements it has to meet. For example, this includes; specific requirements for aerodrome maintenance including visual navigation aids, including an inspection programme and monitoring of its achievement, security and control of ground vehicle requirements.

4.5.2 Subpart C – Operating requirements for aerodrome

a) Aerodrome maintenance

Rule 139.103 requires specific maintenance of the aerodrome operating surfaces and facilities. In particular, there is a requirement for real-time surface condition reporting when a runway is contaminated.

Rule 139.105 requires visual aids for navigation to be maintained, checked for accuracy and, if unserviceable, returned to service without undue delay.

b) Emergency Plan

Rule 139.109 requires the emergency plan to be tested at least every two years, including co-ordination with all the agencies involved.

c) ARFF

Rule 139.111 requires ARFF to be available for regular air transport operations of an aircraft with more than 30 passenger seats. The rule also prescribes requirements for ARFF equipment maintenance and personnel training and availability.

d) Apron management service

Rule 139.115 requires an apron management service to be provided if it is warranted due to traffic volume or other operating conditions, and for this to be co-ordinated with the aerodrome control service provider (if there is aerodrome control).

e) Aerodrome inspections

Rule 139.117 has specific requirements for aerodrome inspections to be conducted to ensure the required maintenance is being done, staff to be suitably trained and to alert to any unsafe condition.

f) Ground vehicles

Rule 139.119 requires control of ground vehicles on operating areas, and for such vehicles to be limited to those that are necessary for aerodrome or aircraft operations. It also requires a system of communication with vehicles to be established and for all airport tenants or users who operate vehicles in operational areas to comply with the requirements. Effectively this means an airside vehicle and driving permit system must be implemented.

4.5.3 Subpart D – Aerodrome security

a) Security

Rule 139.203 has extensive requirements for security designated aerodromes, but designation is not currently required for operation of aircraft with fewer than 90 passenger seats.

b) Non-security designated aerodromes

Rule 139.205 prescribes requirements for non-security designated aerodromes. While actual screening is not required, the aerodrome operator is required to have contingency procedures in place for its activation if regular operations by aircraft with more than 30 seats are occurring. If the aerodrome has operations of aircraft with 19 or more passenger seats, it must maintain a security awareness group and ensure security training is provide for all relevant staff.

Some other lesser requirements also apply for regular operations of aircraft with 19 or more passenger seats.

There are no specific security requirements for regular operations of aircraft with fewer than 19 passenger seats.

5 GENERATIVE INTERVIEWS

5.1 ATTENDANCE

The following people attended generative interviews, either in person or via Zoom. These were conducted by Dean Clisby, Dave Park and Steve Ackland, with the assistance of Dan Allen. Some interviews were conducted in person, and some via Zoom.

NAME	REPRESENTING
Antony Sproull	Air Milford
Chris Pond	NZALPA
Mark Deaker	Alpine Heli
Megan George	Glenorchy Air
Sue Kronfeld	Independent/ AOPA
Peter Hendricks	NZ Flying Adventures
Andrew Wilton	Private Owner
Jeremy Booth Aviation	Skydive Wanaka/Performance Aviation
Jason Eteveneaux	Sounds Air
Taylor Rhind	Sounds Air
Paul Cooper	Southern Alps Air
Ryan Cooper	Southern Alps Air
Callum Smith	Twenty24
Fox Lee	U-Fly Wanaka
Hamish McGill	U-Fly Wanaka
Don Grant	Wanaka Airport Users Group
Jason Lush	Wanaka Helicopters/Learn to Fly
Pete Spencer-Bower	Wanaka Helicopters/Learn to Fly
Ed Taylor	Warbirds over Wanaka
Jo Learmonth	Wanaka Aerodrome
Jeff Hair	Wanaka Aerodrome
Jamie Waaka	Wanaka Aerodrome
Daniel Dodd	Wanaka Aerodrome

The following people or organisations were contacted but did not choose, or were unable, to attend an interview.

NAME	REPRESENTING
Scott Calder	Air NZ
Steve Kelly	Air NZ
Steve Scott	Air NZ
Tim Rayward	Air Safaris
Frances Dowdle	Airways Corp
James Evans	Airways Corp
Tim Bradding	Airways Corp
Todd Kendall	Airways Corp
Hugh Faris	ALPA
Jonathan Wallis	Alpine Group Ltd
Toby Wallis	Alpine Group Ltd
Tracey Bean	Alpine Group Ltd
James Stokes	Glenorchy Air
Kevin Gale	Heli Otago
Andrew Dennyson	Helicraft
Rod Price	Helicraft
Grant Stewart	HeliSupport NZ
Kelly Buick	HeliSupport NZ
Austin Jones	Learn To Fly
Andy Pye	Milford Sounds Flights
Rhys Akers	NZ Hang Gliding and Paragliding
Alex Turnball	Queenstown Milford Users Group
Na'ama Gueta	Sounds Air
Elliot Kensington	True South
Gareth Allen	True South
Peter Daniell	True South

5.2 RISK ASSESSMENT

Assessment of credible critical risks was performed utilising information gathered in the generative interviews, using the SFARP approach.

The key credible critical risks relating to aerodrome layout are detailed below:

- a. Conflict between aircraft taking off or landing and aircraft taxiing on the RWYs.
- b. Aircraft taxiing between the apron and taxiway W passing through the FATO area.
- c. Taxiway W and associated aircraft parking area/s layout congestion risking damage to aircraft and injuries to persons.
- d. A lack of parking space for fixed wing aircraft, leading to congestion and parking in inappropriate locations (e.g. blocking taxiway W or on privately leased land in the taxiway Y area).
- e. Aircraft doing engine run-up in unsuitable areas damaging parked aircraft or people nearby.
- f. Aircraft landing on grass runway 11 being damaged due to its reportedly rough condition.
- g. Aircraft excursions laterally from the runway ending outside the 90m wide strip.
- h. Aircraft overrunning the runway end or undershooting the runway end outside the 60m long strip ends.
- i. Providing adequate separation between fixed wing and helicopters bases.
- j. Security and airside vehicle concerns due to inadequate or no fencing between hangars and keypad entry to barrier arms at vehicle access points.

These credible critical risks are discussed in the following section, including current mitigating procedures and practises (as published in the AIP and other sources of information), as well as recommendations that could further reduce the risk So Far As is Reasonably Practicable.

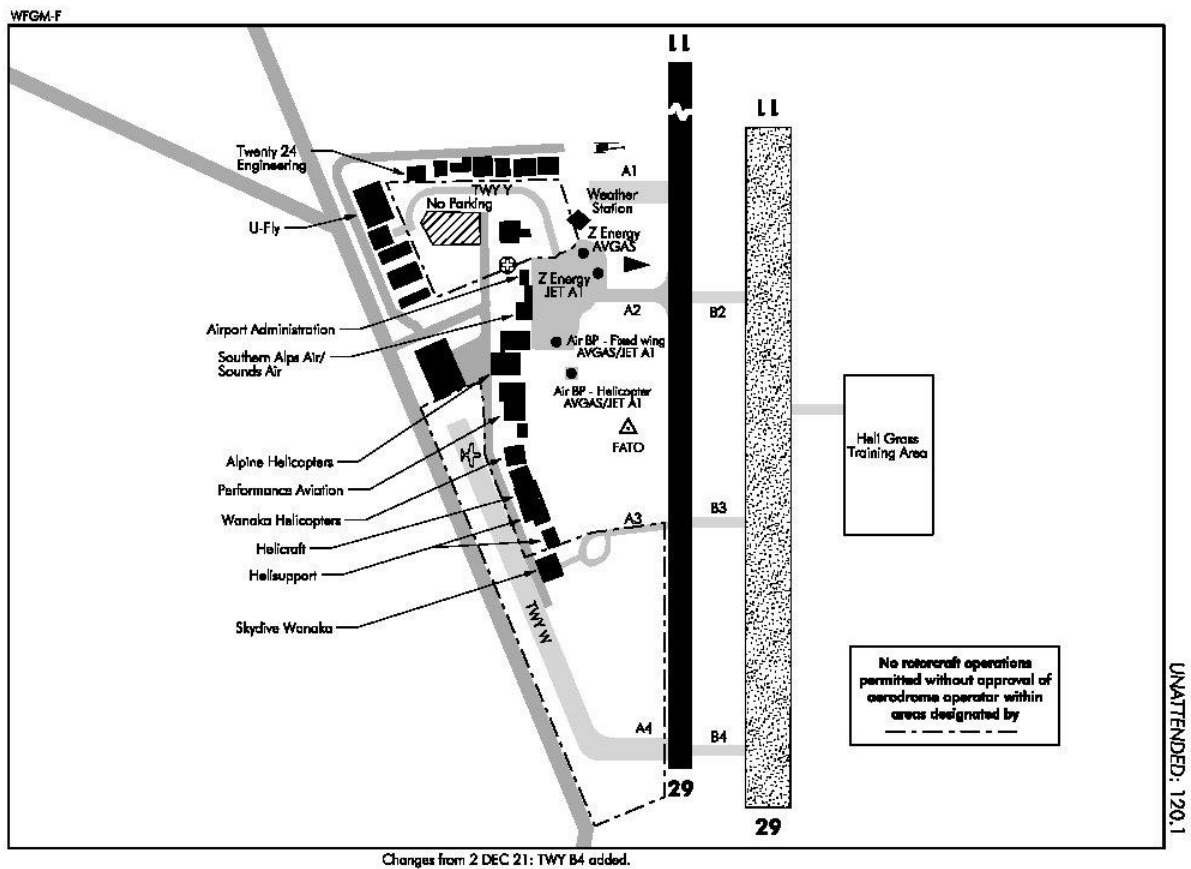
6 KEY OUTCOMES

6.1 CURRENT AERODROME DESIGN AND RECOMMENDED ENHANCEMENTS

6.1.1 GRASS TAXIWAY

The diagram below shows the existing taxiway layout as published in the AIP.

Diagram4: NZWF ground movements chart



Reproduced from NZAIP as at 11 Aug 22

The sealed runway 11-29 has four entry points, stub taxiways A1 to A4. If taking off on 29, the prevailing take-off direction, entry from A1 to A3 requires backtracking on the runway to use full length of runway 29. Whilst some fixed-wing operators can accept less than full runway length, Part 135 certificated operators advised the study team that it is their policy to use full length. The table below shows the runway 29 take-off run available from each stubway position and the backtrack distance required to use full runway length.

For a Part 135 operator entering the runway from the apron (stubway A2), the prevailing runway direction requires backtracking (more than half the runway length for RWY 29) for every take-off if full length is required. This not only increases the risk of a runway incursion, but it also slows down operations reducing the efficiency of the runways, given that simultaneous parallel operations are prohibited. Slowing down operations reduces runway capacity and, as movement numbers grow, increases risk as the time gap between potentially conflicting movements reduces.

Table1: Runway 29 take-off and backtrack distances¹³

Runway entry point	Take Off Run Available (TORA) on RWY 29 from entry point	Backtrack required to use full length of RWY 29
A1	425m	775m
A2	570m	630m
A3	870m	330m
A4	1200m	0m

Taxiway W's isolation from the rest of the taxiway system also increases taxiing on the runway as the only way of reaching W using published taxiways is from the 29 end of the runway. Consequently, an aircraft landing on 29 wishing to use W to reach the aircraft parking area at its NW end has to backtrack from the end of its landing roll to the start of runway 29 then turn off onto taxiway W. This is especially hazardous if an aircraft landing on 29 is not aware of an aircraft close behind on approach and turns 180 degrees on the runway to taxi back to W. The reverse applies to an aircraft leaving taxiway W and taking off on runway 11, possibly backtracking the complete length of the runway.

Both situations arise as there is no marked taxiway between the apron and A4. The majority of operators we interviewed considered a taxiway parallel to the runway through this area would be a major improvement to safety and operational efficiency.

Diagram 5 shows the indicative location of the recommended parallel taxiway and the clearances from the wingtip of a taxiing aircraft to a fixed object (such as a parked aircraft) on the south side of the taxiway. This taxiway layout assumes:

¹³ For take-off on runway 11 the distances are reversed e.g. entry at A2 provides 630m TOR on 11 from that point, or 570m backtrack to the start of runway 11.

- g) A 150m wide runway strip
- h) Taxiway sized for use by Code A and B aircraft (maximum wing span 24m)
- i) 87m runway centreline to taxiway centreline separation
- j) 20m clearance from taxiway centreline to taxiway clearance line (provides 8m wingtip to object clearance for 24m wingspan aircraft on the taxiway)
- k) The FATO is moved north from its current location to the south edge of the sealed runway.
- l) An air taxiway is established between the FATO and the parallel taxiway.
- m) That a note be added to the Aerodrome Chart in the AIP that all helicopter arrivals/departures must be via the FATO and air taxiway.

Diagram 5: Indicative parallel taxiway layout



On the opposing side, one helicopter operator expressed concern over the resulting reduction in the area available for helicopter parking and the taxiway proximity to the FATO. We consider this can be addressed by moving the FATO to the edge of the runway, as shown in the diagram. This will also encourage helicopter pilots to track on runway centreline to the FATO rather than offset.

Also, the Skydive operator expressed concern over having to move its jumper loading closer to its base because the taxiway would pass through the circular taxiway area it currently

uses for loading. However, as shown in the diagram, the southern half of the circular loading area is outside the taxiway clearance line and can still be used for emplaning jumpers.

From a comment received, hold points on the taxiway, clear of the crossing air taxiway for FW aircraft using the taxiway, should be established. There should be a requirement added to the Aerodrome Chart in the AIP that fixed wing traffic on the taxiway give way to helicopters using the air taxiway to and from the FATO.

Recommendation A1: A parallel Code B taxiway is developed between stubs A2 and A4 with its centreline 87m south of the runway centreline, and an equipment/parked aircraft clearance line a further 20m south. This can be a grass taxiway so long as drainage permits its use in all but the wettest weather.

Recommendation A2: The FATO is moved to the south side of the sealed runway as shown in diagram 5, with an air taxiway connection to the parallel taxiway.

6.1.2 Review of taxiway W and aircraft parking

The strip of land where W runs, between the airport's State Highway (SH) 6 boundary and the fence beside the access road to Skydive Wanaka and other hangars, is quite constrained at only 40m wide behind Skydive Wanaka increasing to 50m behind Wanaka Helicopters. Vegetation on the SH6 boundary and relocatable buildings and parked aircraft on the access road boundary reduce the width to just 26-28m in places. The photographs below show the situation.

Diagram 6: Taxiway W looking west to Twenty-24 (L) and east (R). Note parked aircraft and vegetation on SH6 side



Code A taxiways require a clear width of 31m and Code B requires 40m.¹⁴ This can be reduced to 24m and 33m respectively if the taxiway is classed as a taxi lane to an aircraft parking position for which wingtip clearances are reduced to 4.5m on the assumption that taxiing speeds will be lower.

We understand aircraft larger than Code A are required to access Twenty-24 occasionally. Within reason this would be possible provided special procedures are developed and used, such as the use of “wing walkers” and clearance of parked aircraft as required.

The ground movements chart does not show specific parking area/s accessed from W, the parking symbol is on the taxiway itself which is clearly not what is intended as it blocks access. If classified as a taxi lane there is sufficient room for aircraft with span up to 10m to “parallel park” adjacent to the access road fence as is currently done by Wanaka Helicopters fixed wing aircraft. A larger parking area, which could be accessed from the parallel taxiway or W, could be developed east of Skydive Wanaka as shown in diagram 5.

In summary the recommended actions below will reduce risks (a) to (d) identified in section 5.2 SFARP.

Recommendation A3: Taxiway W is connected to the rest of the airport via the proposed parallel taxiway and is restricted to Code A aircraft unless accessing Twenty-24 for which special procedures should be developed.

Recommendation A4: An aircraft parking area east of Skydive Wanaka, as shown in diagram 5 should be marked out and shown in the AIP. If required additional “parallel parking” for aircraft with wingspan 10m or less can be along the access road fence line. Fixed tie down positions should be provided here to ensure parking is parallel and as close to the fence as practicable.

6.1.3 ENGINE RUN-UP LOCATION

The lack of a designated area for pilots and engineers to conduct extended pre-flight or post maintenance engine run-ups has resulted in these being done in a variety of areas which adds to congestion and may result in damage to adjacent aircraft, or injuries to persons in the vicinity.

¹⁴ For Code A 15m max wingspan plus 8m wingtip clearance each side, for Code B 25m maximum span plus 8m each side.

Diagram 5 – [the parallel taxiway diagram in 6.1.1] identifies an area approximately 40m in diameter south of the runway 29 end and clear of the runway strip that would be suitable for short duration run-ups for Code A aircraft.

As aircraft in this position may infringe the runway's 1:7 transitional OLS surfaces (acceptable for aircraft holding for take-off) the run-ups should not be prolonged and aircraft should not be parked there unless a run-up is being conducted.

A run-up area for larger aircraft is best identified as part of the airport's next Master Planning process. Meanwhile short duration run-ups can be done on the sealed runway 29 end between movements.

Recommendation A5: The area identified in diagram 5 for runups should be designated as such on the AIP ground movements chart, suitable for short duration runs by Code A aircraft only.

6.1.4 GRASS RUNWAY SURFACE CONDITION

The 11 end of the grass is reportedly very rough, discouraging pilots from using it and possibly contributing to aircraft damage and accidents.

Recommendation A6: The grass runway is restored to a smooth condition at the 11 end. Meanwhile its rough condition should be NOTAM'd.

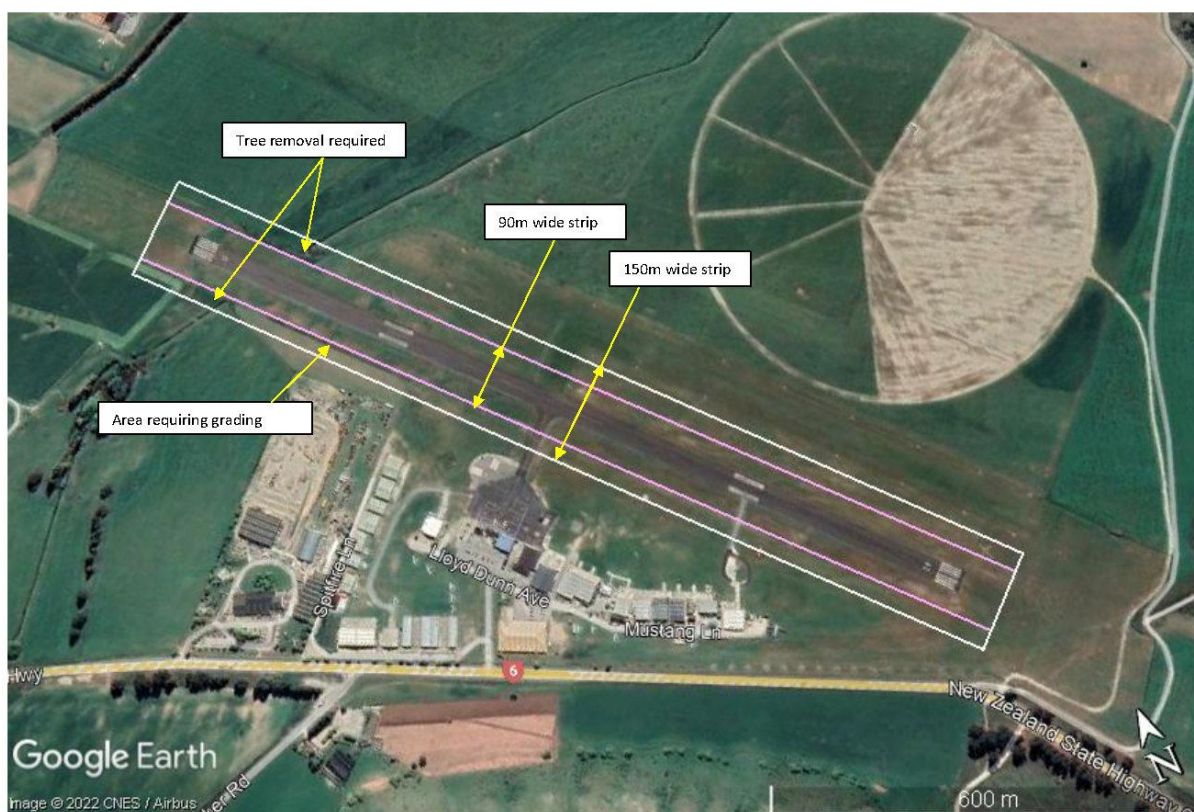
6.1.5 RUNWAY STRIP WIDTH

The current runway strip width is 90m. Per CAR139 C.2.2, 90m strip width is only suitable for a Code 2 runway having non-instrument operations. As runway 29 has a RNAV(GNSS) procedure published it is reasonable to assume the runway is, or should be, classed as an instrument non-precision runway. Instrument non-precision runways for all air transport operations require a 150m wide strip. This applies whether the aerodrome is certificated or not as the applicable AC139-6 refers to the strip width standards in CAR139 and also the Part 125 air operator requirements applicable to the PC12 require the aircraft operators to comply with Part 139 standards for strip width.¹⁵

¹⁵ Refer CAR125.77(d)(3)

The outline of the existing 90m wide strip and a 150m wide strip are shown in Diagram 7 below.

Diagram7: Comparison of 90m and 150m wide runway strips



There is physical room for within the airport boundary for a 150m wide strip, however on the south side behind the Toy and Transport Museum the area between the 90m and 150m widths is not graded for several hundred meters of its length resulting in a sharp difference in levels, i.e., an embankment. This is acceptable under AC139-6 for a Code 2 instrument runway, but a Code 3 runway requires the full 150m width to be graded.

Additionally, a water race runs transversely across the strip towards the 11 end. The race is piped under the existing 90m strip width but is open outside 90m. It would require covering for compliance with a fully graded 150m wide strip but can remain open if it is in an ungraded section.

Within the non-graded area of a 150m wide strip vegetation near the 11 end that should be removed and the embankment area on the south side of the 90m wide strip levelled.

Increasing the strip width to 150m, even with an ungraded section, will reduce the potential hazard in the event of a runway excursion. Given the additional land required for the 150m

wide strip is already owned by QLDC and it is comparatively low cost to remove vegetation and level the embankment, we recommend this is done benefit both the existing PC12 and business jet operations.

Grading the strip to its full 150m width will further reduce risk of aircraft damage and harm to occupants in a runway excursion but will be more costly due to the need to culvert the water race. Accordingly, we believe full grading could be delayed until regular air transport operations by aircraft with more than 30 passenger seats occur.¹⁶

Recommendation A7: Increase the width of the runway strip to 150m by removing the trees and any other significant obstructions within it and grading the embankment.

Recommendation A8: Grade the full 150m strip width, including culverting the water race, to remove the level transitions.

6.1.6 RUNWAY END SAFETY AREAS

Under CAR139, runway end safety areas (RESA) are only required for the regular operation of aircraft with more than 30 passenger seats. Consequently, as the only current scheduled services are by aircraft with 9 passenger seats, there is no regulatory requirement for RESA. If required, RESA must extend 240m (if practicable) beyond the strip end of each sealed runway direction with a minimum width of 30m each side of the runway centreline.

Diagram 8 shows the areas available for RESA at the runway ends assuming the RESA runs across the paper road at the 29 end.

¹⁶ Regular air transport operations are defined in CAR1 as being four or more air transport operations for the carriage of passengers between two or more aerodromes within any consecutive 28 day period.

Diagram 8: The Area Available for RESA at each Runway End.

At the 11 end, 240m long by 90m wide RESA is available. At the 29 end a total of 215m of RESA is available 165m of which is at 90m width and the remaining 50m is at the minimum 60m width (being twice the runway width).

To qualify as RESAs these areas should be graded and be cleared of any objects that may damage any aircraft overrunning or undershooting the runway. The 29 end already meets this standard. At the 11 end some fencing may need to be removed and the surface graded, but these works are expected to be minor.

In any event the RESA areas should be protected from any development which does not meet the RESA standards.

Should aircraft with more than 30 passenger seats commence scheduled services then the RESA would need to be approved by the CAA. It is possible CAA will not accept the 29 end RESA as it is less than the 240m required under CAR139 if it is practicable to provide that length. As it is likely the runway would need to be extended at the 11 end to accommodate larger aircraft that would provide the opportunity to move the 29 threshold NW by 25m to provide the required 240m RESA at that end.

Recommendation A9: Protect the overrun areas at each sealed runway end, including allowance for a future 550m runway extension at the 11 end, for future RESA.

Recommendation A10: Should regular operations of aircraft with 30 or more seats be planned then prepare RESAs at each sealed runway end in compliance with CAR139 Appendix A.1. and obtain CAA's approval for it.

6.1.7 Providing adequate separation between fixed wing and helicopters bases.

It is well established in airport planning that fixed wing and helicopter operations should be kept separate as far as possible, primarily due to the rotor wash and propellor wash each can inflict on the other.

At NZWF separation has largely been achieved by basing helicopters at the east of the apron and fixed wing (aside from Skydive Wanaka) west and south of the apron at taxiway Y. However, recently two private helicopters have been permitted to be hangared in the fixed wing area. This was identified as a potential hazard by several operators interviewed.

The risk is mitigated to some extent as, we are advised, the helicopter movements are infrequent and their operators are aware of the hazard they can create. But if more helicopters are permitted in this area, it will become a safety issue.

Recommendation 10: QLDC reviews the leases on the hangars in the taxiway Y area and, if possible, prohibit the hangaring of helicopters in that area.

Ongoing separation is best addressed through a robust airport Master Plan that provides separated areas for both types of aircraft and allows for expansion of hangars and associated facilities in an orderly and well-planned way.

It's outside the scope of this aeronautical study to suggest where the respective areas should be. We note the last NZWF Master Plan was prepared in 2008 and is likely to need reviewing to reflect the current mix of operations and QLDC's aspirations for the airport.

Recommendation A11: QLDC urgently reviews and updates the 2008 Master Plan to reflect the expected future mix of operations and its aspirations for the airport, ensuring that fixed wing and helicopter operations and basing are separated as far as practicable.

6.1.8 Security and airside vehicles

QAC airport staff when interviewed expressed concern over airside vehicle access and, to a lesser extent, unauthorised people going airside. Several operators commented on farm animals escaping onto the runway, clearly a hazard to aircraft operations.

The Wanaka Airport Operations Manual at Section 15 sets out policy, responsibilities and procedures relating to security based on compliance with Part 139 Certificated Aerodrome requirements.

Our visual inspection of the fences and pedestrian and vehicle access gates revealed several security weak points:

- Inadequate fencing between hangars in the taxiway Y area
- Gates left open
- Vehicle barrier arms that pedestrians can walk under or around
- Inadequate fencing between the airport and its rural neighbours on the north side of the runway

The photos following, taken on 22 Oct 2022, illustrate these weak points. Diagram 10 shows the correct type of fencing for areas the public can easily access and between hangars.

Additionally, we were advised during interviews that the barrier arms intended to prevent unauthorised vehicle access are ineffective as the passcodes are well known and access is effectively uncontrolled. As an example, we were advised that it is not uncommon to see boats on trailers being taken airside to refuel at aircraft fuel pumps. We were also advised that there is no airside drivers permit system in place.

On the positive side we did note a number of CAA” Operational Area No Trespassing” signs on fencing, including some in Mandarin installed pre-Covid when the airport had a large number of Chinese visitors.

Diagram 9: Examples of weak airside security found at NZWF



(clockwise from top left; unsecured gate, no fencing between hangars, inadequate fencing, barrier arm pedestrians and animals can get under or around)

Diagram10: Suitable security fencing in public areas

Whilst NZWF is a general aviation airfield with relatively few scheduled aircraft movements, it is still important to maintain a basic level of security for the safety of airside operations. The PCBU requirements under the Health and Safety at Work legislation are especially relevant to members of the public going airside.

Recommendation A12: Review all fencing and upgrade to the standard in diagram 10 in areas that the public can easily access and between hangars, and robust 5 wire stock fencing on rural boundaries.

Recommendation A13: Change all vehicle access to swipe card and upgrade barrier arms airside to barrier gates, to prevent pedestrians and animals gaining airside access around or beneath the barrier.

Recommendation A14: Implement an airside vehicle permit system to only permit vehicles and drivers airside for bonafide purposes relating to aircraft or airside operations.

6.2 REQUIREMENTS FOR QUALIFYING AERODROME

Section 6.1 presented the findings of the aeronautical study on airport layout and infrastructure and recommendations to address risks identified SFARP. The Qualifying Aerodrome certification requires these items to be addressed, either as recommended or in another way that gives the same or better outcome.

Section 4.4 lists the various sub-parts of CAR139 that relate to Qualifying Aerodrome certification and operations, together with specific items that need to be addressed such as requirements for personnel, policy, and procedures (exposition), establishing aerodrome limitations. The CAR139 areas we see Wanaka Airport needing to address to meet these requirements are discussed below.

6.2.1 Subpart AA – Determination for Qualifying Aerodrome

The required Aeronautical Studies have been prepared in the form of this Part A report and the companion Part B report on airspace risk. Risks have been identified and recommendations for risk removal or reduction SFARP have been made. Subject to CAA review of the studies, these would need to be implemented.

CAA will then decide whether Qualifying Aerodrome certification is appropriate or whether full certification is required.

6.2.2 Subpart F – UNICOM and AWIB

This is discussed in the Part B airspace risk Aeronautical Study with the recommendation that:

- Aerodrome and weather information broadcast (AWIB) should be implemented at NZWF
- Universal air-ground communications (UNICOM) aerodrome information or aerodrome flight information service (AFIS) is not required at this time, but we have recommended that NZWF consider introducing a UNICOM at NZWF once sustained movements indicate more than 50,000 movements per annum.

Consequently, for the existing level of service using PC12 aircraft AWIB alone is sufficient.

6.2.3 Subpart G – Certification requirements for a Qualifying Aerodrome

a) Personnel requirements

As discussed in Section 4.4.3, Rule 139.401 requires certain competent “senior persons” to be nominated as the Airport’s Chief Executive Officer and Airport Manager. Currently we understand the Airport safety oversight is the responsibility of QAC’s Airport Operations Manager under a delegation from QAC’s Chief Operating Officer, with day-to-day airport management functions being allocated to two Duty Operations Managers based at NZWF.

The Wanaka Airport Aerodrome Operations Manual (WFAOM) states at Section 5.0 that this manual details how QAC ensures safe and efficient management of Wanaka Airport. However, we note that the manual is still in draft form with an expiry date of 31 Dec 2020 and was last amended on 1 Jul 2021.

Qualifying Aerodrome certification would require a CEO to be nominated. This person must be accepted as a “senior person” by the CAA and must have the financial authority to ensure the airport can fund its safety obligations, including any infrastructure required. If QAC continues as the designated Aerodrome Operator, we believe the QAC CEO should be the CEO for Wanaka Airport as any lower position is unlikely to have the financial authority required. However, QLDC may wish to have a QLDC member hold this position.

The Management Agreement between QLDC and QAC under which QAC operates NZWF would also need to be reviewed to ensure the nominated NZWF CEO has the necessary financial authority from QLDC as the airport owner.¹⁷

For the Airport Manager role, either one of the two duty managers could be accepted by the CAA as the senior person and would need to take responsibility for safety management, or QLDC may wish to have a QLDC member hold this position.

b) Limitations

Rule 139.403 requires a Qualifying Aerodrome operator to establish and publish any limitations on the use of the airport arising from design or facilities and services. The WFAOM at Section 13 contains only the operating hours from the QLDC Wanaka Airport Designation. Other limitations recommended include:

- Limiting scheduled operations to aircraft with 30 or fewer passenger seats.
(Qualifying aerodrome limitation)

¹⁷ Review of the management agreement is outside the scope of this Aeronautical Study.

- Limiting non-scheduled operations by aircraft with more than 30 passenger seats to those with prior written approval of the airport operator, except in emergencies or for unplanned diversion. (Runway loading, ARFFS coverage, apron management)
- Prohibiting parachute, glider and hot air balloon landings, except in emergencies. glider and hot air balloon take-offs also to be prohibited. (Avoiding mix of aircraft types and types of operation increasing airspace risk)
- Except in an emergency, fixed wing aircraft operations to be between morning and evening civil twilight only. (Lack of aerodrome ground lighting)

c) Public protection

Rule 139.405 requires appropriate safeguards as described in Section 4.4.3(c) of this report. As described in Section 6.1.8 the current security fencing is inadequate and the security culture among some of the airport community appears to need improvement. Our recommended improvements in security fencing and barrier arms would need to be implemented and we also recommend the establishment of a security awareness group at the airport to improve security culture.

d) Notification of data and information

Rule 139.407 requires procedures for notification of changes to aerodrome condition and operational data. This in turn requires a system of daily inspections, processing of pilot reports and regular surveys.

The WFAOM at Sections 14 and 16 contains policy and procedures intended to comply with these requirements to a fully certificated aerodrome standard. These procedures should be reviewed for both appropriateness and the existing level of conformance, i.e. the extent to which they are actually being done at NZWF. Then they should be formalised as part of the NZWF aerodrome exposition.

e) Safety management

Rule 139.409 requires the airport to have an SMS appropriate to the size of its operations. The WFAOM at Section 4 contains a health, safety and security commitment policy signed by the (then) QAC CEO. Section 12 titled “System for Safety Management” refers to the QAC SMS Framework documents for policy and procedure for safety management at QAC.

This implies, but does not clearly state, that NZWF comes under the same SMS policy and procedure as approved for Queenstown Airport i.e. the CAR139 standard for a fully certificated aerodrome. While of course this meets the requirement for a Qualifying Aerodrome we expect there is will be a lot in it that is not relevant at NZWF, e.g. enhanced security, screening requirements, biosecurity, aerodrome lighting and visual aids, provision of air traffic control etc.

Accordingly, it may provide more focus to provide an SMS tailored to NZWF as is permitted under the Qualifying Aerodrome SMS requirement.

f) Movements data

Rule 139.411 requires movements data to be reported quarterly to CAA. The WFAOM at Section 28 specifies that this will be done by the Wanaka Airport operations Manager annually. This needs to be increased to quarterly.

g) Work on aerodromes

Rule 139.413 requires procedures to ensure works on the airport do not endanger aircraft operations. This is comprehensively covered in Section 19 of the WFAOM, including the requirement to prepare and manage Method of Works Plans.

h) Documentation

Rule 139.415 requires relevant documentation such as operating manuals to be kept up to date. We understand the only relevant documents for NZWF are the WFAOM and the Wanaka Airport Emergency Plan (WFAEP). As previously mentioned, the WFAOM document is still in draft form and is not up to date, each page showing an expiry date of 31 Dec 2020. The WFAEM is in the same state.

Irrespective of Qualifying Aerodrome certification, the documents need to be updated urgently. This may be quite simple, only requiring to remove “draft”, remove the expiry date, insert new CEO and COO/ Head of Operations and Safety signed statements and update the organisational structure. However, we recommend taking the opportunity to review the material in the documents for accuracy and where possible incorporate the more easily addressed recommendations from this report.

i) Exposition

Rule 139.417 requires NZWF to have an exposition defining the organisation and its methods of compliance with aviation regulatory requirements. We believe the WFAOM and WFAEM can form the basis for the exposition with expansion to cover the shortfalls identified in this report. In particular we believe the SMS should not simply refer to QAC's SMS which the Wanaka airport community will not be aware of and will consequently not be able to perform their obligations under e.g. for occurrence reporting.

The WFAOM covers most areas required under the exposition with the exception of:

- **Emergency plan** - the policy for emergency management should be included in the WFAOM with the actual procedures being in the WFAEM. At the moment the WFAOM does not appear to mention the emergency plan.
- **Rescue and fire-fighting** – policy should be included in the WFAOM with the procedures in the WFAEM (as they are currently). This aeronautical study does not contain a recommendation that ARFF be provided at NZWF as it is not a requirement under the Qualifying Aerodrome rules, nor was it flagged as a safety risk in the aeronautical study process.
- **Airside security and vehicle access control.** Although the policies and procedures to control airside security and vehicles are included in the WFAOM at sections 15 and 22, it appears these are not effective. They should be reviewed and made effective by creating a security awareness culture at the airport in line with CAR139.205(b)(i), and constant monitoring by airport personnel.

For Qualifying Aerodrome certification, the airport operator would need to prepare an SMS that included appropriate policy and procedures for these requirements, and ensure they are implemented effectively.

6.2.4 Subpart H – Operating requirements for a Qualifying Aerodrome

Once the aerodrome is certificated by CAA as a Qualifying Aerodrome then it must meet on-going operating requirements as listed below:

a) Continued compliance

Rule 139.451 requires the airport operator to comply with the policies and procedures contained in the exposition and to make it available to all airport who have functions to perform under it.

It also requires the airport operator to notify the Director of any change in the operator's contact details. **Changes to Senior Persons need to be approved by the CAA prior to any change taking effect.**

Rule 139.453 requires procedures to be in place for restricting or stopping aircraft operations in the event of any unsafe conditions. The policy and procedures for this would be included in the exposition. In addition to notification by NOTAM, AWIB, as recommended in the Part B aeronautical study, is a very effective means of advising pilots of any unsafe conditions.

Rule 139.457 requires the airport operator to monitor operations and conduct a further aeronautical study if there is any change. The next trigger point for another study is expected to be when the airport reaches 40,000 annual movements. Given this may be less than 1 years' time it may be sufficient to conduct a review of progress on implementing the recommendations in the Part A and B reports and hold a short workshop with users to determine the effectiveness and whether there are any further safety concerns.

These requirements are consolidated in Appendix 2 Gap Analysis Summary.

6.3 REQUIREMENTS FOR FULL AERODROME CERTIFICATION

Full certification would be required for regular operation of aircraft with more than 30 passenger seats. As mentioned, the requirements for full certification are much more prescriptive than the requirements for Qualifying Aerodrome certification.

Some of the additional requirements only arise if aircraft with 30 or more passenger seats operate regularly, e.g., most security requirements, ARFF and RESA requirements.

For an airport such as NZWF with the only regular operations being by aircraft with only 9 passenger seats, no night lighting and no ground-based navigation systems, the infrastructure requirements are not much greater for full certification. However, there is more "exposition overhead" by way of formal plans for; runway maintenance and inspections, environmental management, and conformance with physical characteristics requirements in AC139-6.

6.3.1 CONCLUSION

Currently NZWF operates as a non-certificated aerodrome and has done so safely for many years. However, expectations of safety management are significantly higher now than in the

past in part due to tragedies such as Pike River and White Island and increased stringency of PCBU responsibilities under the Health and Safety at Work legislation.

NZWF is one of the busier domestic airports in New Zealand with a variety of aircraft operating and scheduled air transport operations, albeit on a small scale. Its movements are assumed to grow as tourist numbers return post Covid-19.

We consider the airport and its owner (QLDC) and operator (QAC) as PCBUs would benefit from the airport obtaining certification as a Qualifying Aerodrome because:

- a) Certification provides a define safety standard to be achieved based on the scale of the operation.
- b) It ensures critical safety elements such as competent management, defined policy and processes to address specific areas of risk, a safety management system and safety auditing (including by the CAA) are in place.
- c) Qualifying Aerodrome Certification is less onerous on an airport with a low level of scheduled passenger aircraft movements and using small capacity aircraft than full certification.

Recommendation A15: That NZWF seek certification under Part 139 as a Qualifying Aerodrome.

7 CONSULTATION INPUTS RECEIVED ON THE DRAFT AERONAUTICAL STUDY

There were 4 consultation inputs received from stakeholders. Key points are noted below, with our response to them


COMMENTS	RESPONSE
Airways: no comments.	Noted.
<p>Performance Aviation requested that the following features be incorporated into the ground run-up area:</p> <ul style="list-style-type: none"> • Is capable of handling Code B aircraft, • Is sealed, • Has rated anchor points suitable to restrain C208 and better during high power run-ups. <p>They also requested a surveyed compass swing area at NZWF.</p>	<p>Noted, but these are not safety or Part 139 issues so are outside the scope of this study. Performance Aviation should discuss this with Wanaka Airport Management.</p>
<p>Skydive Wanaka noted that the taxiway that is recommended is only rated for smaller GA aircraft. They were concerned that any future development may impact their loading area.</p>	<p>Due to restrictions on space, this taxiway would be limited to Code A and B aircraft, which should significantly reduce the requirement for light aircraft to backtrack on the main runway.</p>
<p>Wanaka Helicopters holds concerns that the proposed parallel taxiway will confine helicopter movements on the south side of the proposed taxiway to an unsafe extent, particularly noting that in general, proposed changes are due to an increase in activity on the airfield. (In other words, it's already reasonably tight on a busy day in the current climate; this plan will reduce the available space in an even more congested context).</p>	<p>It is noted that this may reduce helicopter manoeuvring/ parking in the area south of the runway. However, we feel that reducing light aircraft backtracking on the runway outweighs this from a safety perspective.</p> <p>Ideally, development of the land west of the Transport Museum could enable all helicopter activity to be relocated there, with a dedicated helicopter arrival and departure sector. This commentary has been added to the final Part B report.</p>

<p>Wanaka Helicopters felt, regarding repositioning of the FATO, that co-locating it with the proposed parallel taxiway would be a safer option than moving it closer to the sealed runway. In conjunction with the addition of holding points on the parallel taxiway that can be used by taxiing Fixed Wing aircraft in the event of crossing/holding helicopter traffic, we believe this to be a safer layout than having the FATO positioned between the taxiway and runway.</p>	<p>Our concern with placing the FATO on the taxiway is that helicopters final approach and departure will approach over the top of the taxiway, not over the top of the runway. This is unsafe for taxiing light aircraft beneath and effectively blocks the taxiway completely while helicopters are arriving or departing.</p> <p>It is a good suggestion to have hold points clear of the crossing air taxiway for FW aircraft using the taxiway and requiring FW to give way to helicopters using the air taxiway to and from the FATO. This would avoid helicopters having to hover at a taxiway hold point or on the FATO/runway for FW to pass on the taxiway. Commentary has been added to Section 6.1.1 to this effect.</p>
<p>Wanaka Helicopters are concerned that the proposed position of the FATO will put helicopters too close to the sealed runway in front, and too close to the taxiway aft, the latter being of particular concern noting the aft blind spot inherent to helicopter design.</p>	<p>This is noted but the suggested position ties in with the AIP requirement for all aircraft to approach, land, take-off and depart from the runways.</p>
<p>Wanaka Helicopters believe that placing the FATO in a location that is both inconvenient and that reduces safety margins risks the development of even less safe workarounds in our view, and there is risk that visiting operators may just depart from outside their operating hangar instead of using the FATO, reducing safety margins even further.</p>	<p>We believe that the safety implications of avoiding aircraft backtracking on the runway overrides this.</p> <p>A note would be required in the AIP that all helicopter arrivals/departures must be via the FATO and air taxiway. Commentary has been added to Section 6.1.1.</p>

8 CONCLUSIONS

The aeronautical study into risk factors arising from NZWF's operational area layout and infrastructure, in line with the scope in Section 3.1.1, has resulted in fourteen recommendations aimed at reducing the identified ground-based operation risks SFARP.

These recommendations are listed in Appendix 1. Furthermore, we have recommended that Wanaka Aerodrome seek certification as a Qualifying Aerodrome. This report has included a detailed gap analysis of the requirements for both a Certificated Qualifying Aerodrome and a fully Certificated Aerodrome.



Managing Director

Quality Aviation Consulting

APPENDIX 1 – SUMMARY OF RECOMMENDATIONS

Recommendation A1: A parallel Code B taxiway is developed between stubs A2 and A4 with its centreline 87m south of the runway centreline, and an equipment/parked aircraft clearance line a further 20m south. This can be a grass taxiway so long as drainage permits its use in all but the wettest weather.

Recommendation A2: The FATO is moved to the south side of the sealed runway as shown in diagram 5, with an air taxiway connection to the parallel taxiway.

Recommendation A3: Taxiway W is connected to the rest of the airport via the proposed parallel taxiway and is restricted to Code A aircraft unless accessing Twenty-24 for which special procedures should be developed.

Recommendation A4: An aircraft parking area east of Skydive Wanaka, as shown in diagram 5 should be marked out and shown in the AIP. If required additional “parallel parking” for aircraft with wingspan 10m or less can be along the access road fence line. Fixed tie down positions should be provided here to ensure parking is parallel and as close to the fence as practicable.

Recommendation A5: The area identified in diagram 5 for runups should be designated as such on the AIP ground movements chart, suitable for short duration runs by Code A aircraft only.

Recommendation A6: The grass runway is restored to a smooth condition at the 11 end. Meanwhile its rough condition should be NOTAM'd.

Recommendation A7: Increase the width of the runway strip to 150m by removing the trees and any other significant obstructions within it and grading the embankment.

Recommendation A8: Grade the full 150m strip width, including culverting the water race, to remove the level transitions.

Recommendation A9: Protect the overrun areas at each sealed runway end, including allowance for a future 550m runway extension at the 11 end, for future RESA.

Recommendation A10: Should regular operations of aircraft with 30 or more seats be planned then prepare RESAs at each sealed runway end in compliance with CAR139 Appendix A.1. and obtain CAA's approval for it.

Recommendation A11: QLDC urgently reviews and updates the 2008 Master Plan to reflect the expected future mix of operations and its aspirations for the airport, ensuring that fixed wing and helicopter operations and basing are separated as far as practicable.

Recommendation A12: Review all fencing and upgrade to the standard in diagram 10 in areas that the public can easily access and between hangars, and robust 5 wire stock fencing on rural boundaries.

Recommendation A13: Change all vehicle access to swipe card and upgrade barrier arms airside to prevent pedestrians and animals gaining airside access around or beneath the barrier.

Recommendation A14: Implement an airside vehicle permit system to only permit vehicles and drivers airside for bonafide purposes relating to aircraft or airside operations.

Recommendation A15: That NZWF seek certification under Part 139 as a Qualifying Aerodrome.

APPENDIX 2 – QUALIFYING AERODROME GAP ANALYSIS SUMMARY

Rule ref	Subject	Gap to be addressed
139.401	Personnel	Designate WNZF CEO and Airport Manager (QAC CEO and COO/ Head of Operations and Safety respectively), include in exposition.
139.403	Limitations	Aerodrome operating limitations to be established, include in exposition.
139.405	Public protection	Security fencing and barrier arms upgraded
139.407	Notification of data	Aerodrome reporting and inspection policy and procedure in NZWFAOM to be reviewed and checked for conformance.
139.409	Safety management	Review the NZQN SMS for its application to NZWF and consider whether a simpler SMS would provide more focus and be more effective at NZWF. If it is decided to retain NZQN SMS for NZWF then make this clear in the exposition and update the CEO signed statement
139.411	Movements reporting	Increase frequency to quarterly
139.413	Works on aerodrome	No action required
139.415	Documentation	Urgently review and update the WFAOM incorporating those recommendations from this report that are easily done.
139.417	Exposition	Develop an exposition based on the WFAOM and WFAEM suitably expanded to include the recommendations in this report and those relevant from the Part B Airspace report. In particular review the SMS documentation as recommended under 139.411 above, include policy on the provision of ARFF, UNICOM/AFIS, review airside security and vehicle access control effectiveness, and set up a security awareness group as described in CAR139.205(b)(i).
139.451	Continued compliance	Notify Director of CAA of who the nominated senior persons are going to be and obtain CAA's approval for each.
139.453	Unsafe conditions	Review procedures for notifying unsafe conditions in WFAOM for adequacy and effectiveness. Consider implementing AWIB to improve dissemination of information on aerodrome condition to pilots.
139.455	Changes to organisation	Ensure the exposition contains effective procedures to ensure it is kept up-to-date, in compliance with the relevant Part 139 Qualifying Aerodrome requirements and the Director is notified of, and approves, any changes to senior persons and the system of safety management prior to the changes being implemented.
139.457	Aeronautical studies	Include in the exposition a requirement to complete another aeronautical study at the trigger points listed in the Rule, or as otherwise approved or required by the Director.

