

Table of Contents

1	Background	1
1.1	Introduction	1
1.2	Phase 1 Study Objectives.....	2
1.3	Northland Regional Context.....	2
1.4	ICAO Aircraft Reference Code.....	3
1.5	Drawings	3
2	Aeronautical Regulatory Framework	4
2.1	Aerodrome Certification	4
2.2	Standards and Recommended Practices for Aerodrome Design	4
2.3	CAR 139 Rewrite	4
3	District and Regional Planning Context.....	6
3.1	Whangarei District Council Operative District Plan 2007.....	6
3.2	Regional Planning Documents.....	7
3.3	Land ownership.....	10
3.4	Noise – capacity in current contours.....	10
4	Existing Aerodrome Site and Facilities.....	12
4.1	Aerodrome Facilities	12
4.2	Airspace and Surrounding Topography	16
4.3	Geology and Geotechnical Conditions.....	18
5	Existing Aircraft Operations	19
5.1	Passenger Aircraft Operations.....	19
5.2	Aircraft Performance from Existing Runway	20
6	Existing Aerodrome Non-Compliance.....	21
7	Future Regional Aircraft Types.....	22
8	Future Facility Requirements	24
8.1	Navigation Aids	24
8.2	Runway Configuration.....	25
8.3	Air Traffic Services	30
8.4	Airport Rescue Fire	30
9	Onerahi Aerodrome Development.....	31
9.1	Runway	31
9.2	Construction Cost Estimate	33
9.3	Planning and Environmental Issues.....	33
10	Summary and Recommendations	35

Appendices

Appendix A – Drawings

3232530-CE-K001

Existing Airfield

3232530-CE-K010

Future Code 3/1350m Runway

Appendix B - Whangarei Aeordome AIP Information

Appendix C - PAPI Evaluation

Appendix D – Cost Estimate for Runway Extension to 1350m

Appendix E - Acronyms

1 Background

1.1 Introduction

The Whangarei District Airport is located on the Onerahi peninsula some 9kms from the Whangarei central business district (CBD). It is a domestic airport used for both private and commercial flights and accommodates daily scheduled flights by Air New Zealand Link and occasional flights by smaller operators. There are also training facilities, a heliport and a range of private hangars and buildings.

The ownership and operation of Whangarei Airport (WA) is currently undertaken as a joint venture between the New Zealand Government and the Whangarei District Council (WDC). The joint venture is a Council Controlled Organisation with WDC fulfilling both the board and shareholder roles. This covers the provision, maintenance, and operation of the land and facilities, including the runway and terminal buildings. WDC owns the terminal facilities, the runways are in joint ownership (50% WDC and 50% Crown) and the Crown retains ultimate ownership of the underlying land.

The provision of airport infrastructure is essential to support the growth and economic development of the Whangarei District and the wider Northland Region. Master Planning provides the necessary framework to ensure that infrastructure development is undertaken in a timely and considered manner without compromising future development of essential airport facilities. The last Master Plan update was prepared in 1999 and included a desktop analysis of possible alternative airport locations.

The recommendations of the 1999 report included that *“The primary air transport facility for the Whangarei District should remain at the existing Onerahi Peninsula site for the foreseeable future”*. Since the 1999 Master Plan was prepared there have been a number of developments that make it appropriate to undertake a review of the airport operation to re-validate, or otherwise, this recommendation. In particular the sustainability of the Onerahi airport site needs to be evaluated in consideration of recent and pending changes to the Civil Aviation Authority (CAA) Rules, the current regional airline operating environment and the anticipated development of the Air New Zealand regional aircraft fleet.

WDC commissioned Beca in early September 2014 to undertake the “Whangarei District Airport Strategic Review” to be delivered in a series of phased studies to provide advice to “ensure that the Whangarei District has an airport that is capable of meeting the long term needs (30 to 50 years) of its users and the District.” This report is “Phase 1” of the wider Strategic Review.

As part of this commission, it will be necessary to investigate aircraft performance and navigational procedural design issues and Beca has retained the services of Dennis Hoskin of Hoskin Consulting Ltd. to provide this specialist input.

1.2 Phase 1 Study Objectives

“Phase 1” of the Strategic Study examines the existing aerodrome infrastructure and operations at the current Onerahi site and the potential of this site to expand to meet future aviation requirements.

More specifically this study will:

- Define the existing physical and operational restrictions at the current site
- Outline the future requirements of key short to long-term aerodrome facilities to services the Whangarei District
- Assess the environmental and planning constraints associated with remaining at the Onerahi site
- Assess the engineering potential to expand and enhance the current infrastructure to meet the future facility requirements and identify major areas of cost and risks.

Following these assessments we will recommend a long term strategy for the development of the existing site, or alternatively the maximum development potential of the existing site and an approximate time scale for the relocation of operations to an alternative facility suitable for long term development.

1.3 Northland Regional Context

The Northland Region includes three (3) regional airports that are serviced by Air New Zealand – Whangarei, Kerikeri and Kaitaia¹. There are also airfields located at Dargaville and Kaikohe.

The region is currently served by a regional council and three district councils. The Local Government Commission is currently considering a proposal to reform the current structure of Councils in Northland. The Commission’s draft proposal, which was issued in November 2013, was for the formation of one local authority for Northland, to be known as the “Northland Council”². The hearings on this proposal were held in April 2014 and the Commission is now analysing the information received.

The 30 Year Transport Strategy for Northland provides the current direction from the Northland Regional Council on air travel. More discussion on this strategy document is contained in Section 3.2 of this report.

The potential amalgamation of the Northland region’s local authorities may affect the provision and funding of the airports in the region in the future and would logically raise the question of the suitability of one of the existing airports, or a new airport to serve as a “Regional Airport”.

The consideration of the location and facility requirements for a Regional Airport is outside of the current Strategic Study scope. Nonetheless many of the infrastructure elements discussed in this report would find similar application in a Regional Airport Facility.

¹ Air New Zealand announced on 12 November 2014 that services to Kaitaia would cease in April 2015.

² It would be a unitary authority combining the functions of district councils and the regional council.

1.4 ICAO Aircraft Reference Code

The International Civil Aviation Organisation (ICAO) aircraft reference code classification system, which is referenced throughout this report, is shown in Table 1.1 below. The reference code groups aircraft by wingspan and main gear span, and runway by field length for the purpose of specifying required and recommended aerodrome infrastructure characteristics (ie. runway and strip configuration, aircraft manoeuvring clearances etc.) for safe operations.

Table 1-1. Aerodrome reference code
(see 1.7.2 to 1.7.4)

Code element 1			Code element 2	
Code number (1)	Aeroplane reference field length (2)	Code letter (3)	Wingspan (4)	Outer main gear wheel span ^a (5)
1	Less than 800 m	A	Up to but not including 15 m	Up to but not including 4.5 m
2	800 m up to but not including 1 200 m	B	15 m up to but not including 24 m	4.5 m up to but not including 6 m
3	1 200 m up to but not including 1 800 m	C	24 m up to but not including 36 m	6 m up to but not including 9 m
4	1 800 m and over	D	36 m up to but not including 52 m	9 m up to but not including 14 m
		E	52 m up to but not including 65 m	9 m up to but not including 14 m
		F	65 m up to but not including 80 m	14 m up to but not including 16 m

a. Distance between the outside edges of the main gear wheels.

Table 1.1 - ICAO Aircraft Reference Codes

Typical aircraft types currently used in New Zealand classified by the ICAO aeroplane code are shown in Table 1.2 below. Types currently operating to Whangarei are highlighted in bold text.

Aircraft Reference Code	Wing Span (m)	Aircraft Types
A	Up to but not including 15m	Cessna 172,Piper Tomahawk Beechcraft Baron
B	15m up to but not included 24m	Cessna Caravan, Beech 1900D Fairchild Metro III, Jetstream J32
C	24m up to but not included 36m	Dash-8 Q300/Q400 , ATR 72, B737 series A320/A321 series, CV-580,Future 90 seat turboprop
D	36m up to but not included 52m	B757 series, B767 series, C130 Hercules

Table 1.2 - ICAO Aircraft Reference Codes

1.5 Drawings

Please note that all drawings have been included in Appendix A and a list of Acronyms has been included as Appendix E.

2 Aeronautical Regulatory Framework

2.1 Aerodrome Certification

The Civil Aviation Authority of New Zealand (NZ CAA) was established in 1992 as a crown entity under the Civil Aviation Act 1990 and is responsible for regulating Civil Aviation in New Zealand. In this role the CAA is responsible for certifying and monitoring aerodromes engaged in regular air transport operations under CAA Rule Part 139, Aerodromes – Certification, Operation and Use (CAR 139).

To gain certification an aerodrome operator must ensure that the physical characteristics of the aerodrome; the obstacle limitation surfaces; the visual aids for navigation and for denoting obstacles and restricted areas; and the equipment and installations for the aerodrome are commensurate with the following:

1. the characteristics of the aircraft that the aerodrome is intended to serve
2. the lowest meteorological minima intended for each runway
3. the ambient light conditions intended for the operation of aircraft.

The physical characteristics, obstacle limitation surfaces, visual aids, equipment and installations provided at the aerodrome must be acceptable to the Director of the CAA. An “acceptable” standard is detailed in CAA Advisory Circular (AC) 139 - Aerodrome Design.

Once issued, an operating certificate is valid for a maximum of 5 years. Whangarei Airport currently holds an aerodrome operating certificate issued under CAR 139. The renewal date for the current certificate is 2 May 2018. In order to maintain the currency of its aerodrome operating certificate the aerodrome must continue to comply with the requirements of CAR 139. Whangarei airport is generally subject to a brief audit by the CAA each year around March.

2.2 Standards and Recommended Practices for Aerodrome Design

This evaluation of the existing airfield infrastructure and recommendations for future development has been made in consideration of the Standards and Recommended Practices (SARPs) contained in the following documents:

- New Zealand Civil Aviation Authority AC139-6 Aerodrome Design Requirements/All Aeroplanes Conducting Air Transport Operations/All Aeroplanes above 5700 kg MCTOW³ (2011)
- International Civil Aviation Authority (ICAO) Annex 14 – Aerodrome Design and Operations (2009)

2.3 CAR 139 Rewrite

The CAA has a major rewrite of CAR 139 in hand which has already gone through the CAA's Notice of Proposed Rule Making (NPRM) process. As part of industry consultation they have advised that they were intending to fully adopt all the standards currently notified in ICAO Annex 14. Thus when designing a new airport or upgrading existing infrastructure the ICAO Annex 14 requirements

³ MCTOW = Maximum Certified Take Off Weight

should be adopted wherever possible where they are more demanding than the AC 139-6 design standards.

The NPRM for CAR 139 (11-02R 13 March 2014) incorporates the requirements for aerodrome design physical characteristics and OLS requirements as appendices to the Rule. Currently the requirements are included in Advisory Circular AC139-06 as design requirements which are acceptable to the Director of Civil Aviation. Thus should the NPRM be signed into law, anticipated to be in 2015, the non-compliance issues at Whangarei Airport as discussed in Section 6 of this report will have to be addressed through a full exemption process and/or alternatively be made fully compliant with the design requirements.

The full exemption process would require the preparation, submission and public notification (by CAA) for comment of a detailed aeronautical study/safety case(s) supporting the relaxation of the each non-compliance with the rules. Exemptions can only be granted on one of the grounds specified in section 37(2) of the Civil Aviation Act 1990 as noted below:

(a) the requirement has been substantially complied with and that further compliance is unnecessary; or

(b) the action taken or provision made in respect of the matter to which the requirement relates is as effective or more effective than actual compliance with the requirement; or

(c) the prescribed requirements are clearly unreasonable or inappropriate in the particular case; or

(d) events have occurred that make the prescribed requirements unnecessary or inappropriate in the particular case,—

And;

that the risk to safety will not be significantly increased by the granting of the exemption.”

It is difficult to assess how long this process would take with respect to the issues raised in Section 6, however based on previous experience it would be no less than 6-12 months and would require the input of specialist consultants to prepare the appropriate technical submissions.

3 District and Regional Planning Context

The following district and regional plans are relevant to the consideration of the current and future use of the airport site:

- Whangarei District Council Operative District Plan 2007
- Proposed Regional Policy Statement for Northland 2012
- Operative Regional Coastal Plan for Northland 2004

3.1 Whangarei District Council Operative District Plan 2007

Existing Airport

The footprint of the existing Onerahi Airport is covered by a designation for the Aerodrome under the Whangarei District Council Operative Plan⁴ (the District Plan). The designation authorises a range of activities such as aircraft movements, independently of the rules of the District Plan. The Requiring Authority for the designation is the Whangarei District Council. Any conditions or restrictions on the Aerodrome or Airspace designations will override the rules in the Plan.

There are conditions⁵ on the aerodrome designation relating to:

- Compliance with the airport noise limits (Rule 62.5 of the District Plan); and
- The approval of an Airport Noise Management Plan (ANMP).

The underlying zoning of the airport site is 'Airport Environment'. Chapter 45 of the District Plan sets out the rules regarding the land uses in the Airport Environment and applies to activities not falling within the purpose of the Aerodrome designation.

The site adjacent to the eastern end of the existing sealed main runway and airport boundary is zoned open space. The sites to the west (other side of Weir Crescent) of the existing airport boundary and adjacent to the western end of the main runway are zoned a mixture of Living 1 and Open Space.

Figure 3.1 illustrates the designation boundary of the Aerodrome. The purple hatch is the airport designation boundary and the green area is zoned public open space. The blue area is zoned 'Living 1 Environment'.

⁴ Referenced as DW124 on the Map 46 of the planning maps.

⁵ The conditions of designation (DW 124) are listed in Part H, Chapter 85 of the District Plan.



Figure 3.1 –Onerahi Airport zoning under the Whangarei District Plan.

3.2 Regional Planning Documents

Regional Policy Statement for Northland

The Operative Regional Policy Statement (RPS) for Northland covers the management of natural and physical resources in the Northland Region, from Kaiwaka in the south, to Cape Reinga in the north, and out to the 12 nautical mile (22.2 km) limit. The RPS was made fully operative in July 2002. The Northland Regional Council has undertaken a 10-year review of the operative RPS and the Proposed Regional Policy Statement (RPS) for Northland was publically notified with submissions closing 3 December 2012.

The Proposed RPS is in its final decision making phase⁶ (appeals phase). Given the stage that the proposed RPS has reached, we have referred to its content, rather than the Operative RPS, as it is considered to be more relevant to the future use and development of the Onerahi site.

The Proposed RPS contains objectives and policies relating to the provision of regionally significant infrastructure, including Objective 3.7 stated below:

“3.7 Infrastructure

Recognize and promote the benefits of regionally significant infrastructure which through its use of natural and physical resources can significantly enhance Northland's wellbeing.”

Appendix 3 to the Proposed RPS identifies Whāngārei, Kaitiāia and Bay of Islands airports as ‘regionally significant infrastructure’.

The relocation of the Whangarei airport is not dealt with in the RPS, but may be part of future updates to the Regional Land Transport Strategy (RLTS), which is discussed further below. The current RLTS became operative in 2010. The Regional Council must produce a long-term strategy

⁶ 16 Appeals have been lodged to the Environment Court.

every six years. More detailed planning reflecting the overall direction of the strategy is then developed and updated every three years via a Regional Land Transport Programme.

Operative Regional Coastal Plan for Northland 2004

The Northland Regional Coastal Plan (NRCP) contains rules relating to the use, development and occupation of the coastal marine area.

An extension of the runway to the east of Beach Road towards Stevens Point or to the west towards Kaiwaka Point, will require large-scale earthworks and reclamation of land to level a steep contour between the land and the coastal marine area.

The area of the proposed eastern extension towards Stevens Point within the CMA is zoned Marine Management Area 1 (Protection) and the coastal area to the immediate west of the airport is classified as Marine Management Area 2 (Conservation) as shown in Figures 3.2 and 3.3.



Figure 3.2 – Zoning of Onerahi Airport – Northland Regional Coastal Plan



Figure 3.3 Zoning and legend of Onerahi Airport and Stevens Point – Northland Regional Coastal Plan.

The objectives and policies of Northland Regional Coastal Plan provides for development in the Marine Management Area 1 and 2. However the rules contradict the objectives and policies in that any reclamation in the Marine Management Area 1 not for roads or ports is prohibited.

Under these zones resource consent would be required to construct any earthworks (reclamation) required for a runway extension.

■ **Marine Management Area 1 (Protection)**

Consent required: Rule 31.3.5 states that any new reclamation (other than that which is associated with port development (which is a non-complying activity) or public road realignment.) in the MM1 is a **prohibited activity**.

■ **Marine Management Area 2 (Conservation)**

Consent required: Rule 31.4.5 states that any new reclamation activity in the MM2 is a **discretionary activity**.

A resource consent application under the NRCP⁷ could be made for an extension of the runway to the west. However, the option discussed in Section 9 would also require a plan change to the Marine Management rules.

It is a prohibited activity to reclaim in the Marine Management Area 1 zone which covers the area immediately adjacent to the eastern land boundary of Onerahi. A resource consent cannot be made for a prohibited activity. If an extension at the eastern end of the existing runway was pursued, a change to the Regional Coastal Plan would be required. A Plan Change could be sought to alter the rule prohibiting the activity, to include the reclamation for airport purpose (not just road alignment and port activities) to be a non-complying activity. Given the previous experience with the Airport Noise Plan, we would expect any such plan change would attract a high degree of public interest and potential community opposition.

30 Year Transport Strategy for Northland 2010⁸

The purpose of this Strategy is to set the direction for the region's transport system over the next 30 years. The direction provided in the transport strategy⁹ is that the Kerikeri airport is to be developed as a gateway to the Bay of Islands for international visitors. The strategy notes that Kerikeri airport is the only airport in the region with the facility to clear passengers through customs for private international flights. It also notes that the airport operator is currently planning for a future runway extension and upgrades to provide for landings in all weather. The Transport Strategy indicates that the Whangarei and Kaitaia airports will be developed to provide direct flights nationally servicing business and commercial travellers.

The strategy sets out that due to physical limitations the Whangarei Airport cannot expand any further than the recent runway extensions and advocates that increasing the frequency of flights and destinations per day will be sufficient to service the district for the foreseeable future. This Strategy was presumably made on the basis that the aircraft fleet servicing the airport would remain substantially as it is today.

⁷ In conjunction with an alteration to the designation in the District Plan.

⁸ The 30 Year Transport Strategy incorporates the Regional Land Transport Strategy (RLTS) for Northland. The Land Transportation Management Act (LTMA) requires the preparation of a RLTS. The RLTS is a statutory document under the LTMA, which must be prepared every 6 years and cover a period of at least 30 years.

⁹ Refer to Section 5.4

The Whangarei District Growth Strategy 30/50

Section 5.2 of the Infrastructure Chapter 5 of the growth strategy relates to the Whangarei Airport. The growth strategy notes that the existing airport has the ability to cater for an increased frequency of flights and destinations and is considered to provide adequate capacity for the next 30 to 50 years. This statement is based on the conclusions of the Whangarei Airport Operations Review 2003¹⁰. At this time, the airport was serviced largely by the B1900D aircraft and in the future it was considered that the airport would be serviced by 50 seat aircraft. The growth strategy identified (based on 2002 activity forecasts) that there was sufficient capacity with the existing runway to increase flight frequency up to and beyond the high growth (25-year) forecast of 45,500 movements per annum.

When this strategy and the abovementioned Regional Land Transport Strategy are revised, consideration should be given to the impact of the trend for airlines to increase the size of their aircraft servicing regional airports and likely future fleet development, rather than assuming the ability to increase the frequency of flights of 50 seat aircraft.

3.3 Land ownership

The Crown retains the ownership of the land on which the airport is located. The airport land is subject to a treaty claim(s) and has a Section 27B memorial on it.¹¹

For the Onerahi Airport site, the relevant hapu is Te Kahu o Torongare.

3.4 Noise – capacity in current contours

The District Plan establishes an Air Noise Boundary (inner) and an Outer Control Boundary. The location of these boundaries is identified on Planning Map 46R in the Whangarei District Plan. These boundaries have been established for longer term planning purposes and reflect the projected noise boundaries at the Whangarei Airport in 2027. These noise boundaries are based on the Ldn65 and Ldn55 noise levels respectively and the Airport is required to manage its operations in a way that ensures that these overall limits are not breached.

This Whangarei Airport Noise Management Plan has been developed in response to submissions received on the Proposed Whangarei District Plan Variation 2003/33 (Airport Noise). Submissions on the Proposed Variation ranged from engine testing and helicopter noise through to the location and way the Proposed Air Noise Boundaries were calculated.

In order to provide residents and landowners with accurate information relating to current noise emissions and boundaries, the Whangarei Airport authority is required to prepare, using an appropriately qualified and experienced acoustic consultant, noise contours (Ldn55 and Ldn65) by January 31 in every even numbered year (for example 2006, 2008, 2010...).

¹⁰ Beca Planning, 2003 prepared in association with the Whangarei Airport Variation

¹¹ Under s27B, the Waitangi Tribunal can in specified circumstances order the Crown to take back or 'resume' a property to be used in settling a Treaty claim. These memorials remain on the titles even if they are sold to third parties, and are not removed until claims over the area concerned have been settled, or affected Maori groups agree to their removal. The memorial warns third parties that the property may be used for settling Treaty claims through resumption by the Crown. If this happens, compensation is paid as if the property were being acquired under the Public Works Act 1981.

This Noise Management Plan is intended as a management document for the Whangarei Airport Authority and the day-to-day management of the Airport. The Plan will also provide a basis for the Whangarei Airport Noise Management Consultative Committee and the Whangarei District Council for auditing how well the Airport manages noise emissions.

4 Existing Aerodrome Site and Facilities

The aerodrome is conveniently located approximately 9km from the Whangarei CBD. The existing aerodrome site covers approximately 60ha of land as shown on drawing 3232530-CE-K001. Apron, hangar and terminal facilities are all located to the north of the runway with access from Handforth Street.

Notification of the aerodrome infrastructure for use by the aeronautical community is published in the CAA Aeronautical Information Publication (AIP). AIP sheets (AD 2) for Whangarei Aerodrome have been attached in Appendix B of this report. These sheets document the general aerodrome layout, facility availability and configuration of the runway and taxiway systems.

4.1 Aerodrome Facilities

Terminal Precinct

The 1999 Whangarei Airport Master Plan Review (prepared by Beca) reported that there were approximately 14,000 total annual aircraft movements in 1998 which included consideration of all general aviation (GA) and regular passenger traffic (RPT) activity. Of these total movements 8,000 were attributed to RPT traffic. Current annual GA activity at the airport is “minimal” and the current Air New Zealand schedule generates 3,328 annual aircraft movements.

Whilst the number of RPT aircraft movements has declined to less than half of the activity levels experience in 1999, the size of the aircraft servicing the terminal has increased. The majority of RPT flights (85%) currently scheduled to Whangarei are being conducted by the fifty (50) seat Dash 8-Q300 aircraft as opposed to the situation in 1999 when the Metroliner III and Beech 1900 - nineteen (19) seat aircraft were in use.

The terminal functional areas have not been significantly increased since 1998 and subsequently WDC commissioned Opus International to undertake a Terminal Concept and Preliminary Cost Estimate Study in 2013 to address the issue of terminal area congestion. The Opus study documents the current problems with existing terminal and landside roading facilities experienced during peak periods.

Two conceptual options for development of the terminal area were prepared and a rough order cost estimate of \$3.5 Million was developed for the “preferred long term option”. The report does not specifically state the peak aviation activity that the facility was designed for, however it does note that “the current terminal waiting area is too small for the change to Q300 aircraft with a need to expand [from the] existing 38 to 100 seats”. This equates to the passenger loadings on two Dash 8-Q300 aircraft at 100% passenger load factor.

The preferred option doubles the size of the terminal from 331m² to 638m². Discussions with Air New Zealand have indicated that it is unlikely that in the short to medium term there would be more than a peak of two aircraft on the apron at any one time and the terminal footprint proposed in the Opus report would therefore likely serve peak demand at Whangarei for the next 10-15 years.

There is a significant amount of available land surrounding the existing terminal and car park area, and the proposed terminal expansion can easily be accommodated for with additional space remaining for development beyond 10-15 years. It is therefore considered that that expansion of the terminal area to meet future demand in the short to medium term as investigated in the Opus report, as well as in the long term, is not a significant constraint when considering the long term future of the aerodrome an Onerahi.

Airport Rescue Fire Fighting Services

There are no dedicated airport rescue fire-fighting (ARFF) facilities at the airport. A fire extinguisher is available in the terminal building for regular air transport flights. The largest regular air transport services aircraft is the Dash 8-Q300 which is a Category 5 aircraft as defined in CAR 139.

As per CAR 139.59 (c) (2) should the Dash 8-Q300 movement exceed 700 in the busiest 3 month period then the ARRF will be required to meet a minimum of Category 3 capability. As noted in Section 5, based on the current Air NZ schedule the airport is at this threshold of activity.

Category 3 requires a dedicated Rescue Fire Vehicle with 1200 l of water/foam and a minimum discharge rate of 900 l/min and complimentary agents of 135kg of dry chemical power as specified in CAR 139.61 Table 2

Apron and Taxiway

There is a single asphaltic concrete (AC) apron south of the terminal building with dimensions of 105m x 56m. The apron is configured to allow for two Dash 8-Q300 sized aircraft to be positioned on the apron simultaneously.

Three AC surfaced taxiways extend from the apron area, two of which provide access to the northern side of the runway. A short 75m long taxiway is aligned perpendicular to the runway centerline and provides direct access from the runway to the apron. This is the only taxiway used by Air New Zealand (Air NZ) aircraft. The second is a chip sealed parallel taxiway that extends to the west from the apron and joins the runway at approximately 280m from Runway 06 threshold. This taxiway is used by General Aviation (GA) aircraft to access the western hangar areas and the runway and reported in the AIP.

There are various unpaved/grass taxiway provided access to various hangars areas throughout the aerodrome as shown on Drawing CE-K001.

Main Runway 06/24

■ Capacity

It was estimated in the 1999 Master Plan Review that the main runway system is estimated to have an annual average capacity of over 100,000 total annual movements compared to the current demand of approximately 3,400 RPT movements. Detailed forecasting has not been undertaken as part of this study however it is evident that the existing single main runway system has sufficient capacity to serve the long term requirements of the district and region.

■ Configuration

In accordance with AC 139-6 and the operational characteristics of the aerodrome the runway is classified as a Code 2C¹² Non-precision approach instrument runway.

Runway 06/24 has an asphaltic concrete surface and is 1097m long by 30m wide. A 30m long starter extension at the western runway end provides an additional 30m of length for take-off on Runway 06 (ASDA and TODA¹³). The available landing distance of the main paved runway is

¹² A "Code 2" runway is a runway with an Aeroplane Reference Field Length of 800m up to but not including 1,200m as defined in Table 1.1. "C" refers to the aircraft class that the runway is suitable for as defined in Table 1.2.

¹³ TODA = Take-off Distance Available ASDA = Accelerate Stop Distance Available

1,067m on Runway 06 and 1,097m on Runway 24. The reduced landing distance available on Runway 06 is because of a reduced runway strip width at the eastern runway end as discussed later in this section.

Table 4.1 lists the regional airports operated to by the Mount Cook, operating the ATR-72, and Air Nelson, operating the Dash 8-Q300. These two regional airlines are wholly owned subsidiaries of Air New Zealand. As indicated in the table, Whangarei is the shortest runway operated to by Air New Zealand and the shortest runway of the three Northland Region aerodromes (shaded in the table) including Kaitaia which only has Beech 1900D services.

Airport	Runway Length	Current Code C Passenger Aircraft	
		Dash 8 - Q300 (Air Nelson)	ATR-72 (Mt Cook)
Whangarei	1,097	✈	
Kerikeri	1,190	✈	
Kaitaia	1,402	Beech 1900D only	
Paraparaumu	1,287	✈	
New Plymouth	1,310	✈	✈
Gisborne	1,310	✈	
Nelson	1,347	✈	✈
Marlborough/Blenheim	1,425		✈
Mt Cook (seasonal)	1,572	✈	✈
Napier/Hawkes Bay	1,750	✈	✈
Queenstown	1,777		✈
Tauranga	1,825	✈	✈
Rotorua	1,843	✈	✈
Palmerston North	1,902	✈	✈
Invercargill	2,030	✈	✈
Hamilton	2,195	✈	✈

Table 4.1 – North Island Regional Airport Paved Runway Lengths

■ Alignment

The main runway is aligned approximately east-west and traverses the width of the Onerahi Peninsula with significant drops at each runway end, in particular at the eastern end. The topography precludes any simple solution to extending the runway. The existing runway alignment allows for good operational availability in consideration of the prevailing winds and maximises the runway length that can be provided on the existing land-form within the aerodrome boundary.

No records of runway usage are maintained however anecdotal information indicates that runway 24 is in use approximately 65% of the time. This is supported by information presented in the wind rose¹⁴ from the Whangarei Airport Automated Weather Station (AWS) shown in Figure 3.1 which illustrates the predominance of the south-west wind direction.

¹⁴ A wind rose is a circular chart that plots the occurrence frequency of wind in a set of speed ranges against the direction that the wind blows from. The frequency of occurrence of very light winds, designated as of “variable” direction, and calm are charted separately. The occurrence frequency is expressed as a percentage of all the observations.

For comparing the runway alignment to the wind rose, the runway bearing at Whangarei is 060/240 Magnetic, referenced to geographic north (as the wind data is) the runway bearings is 080/260 True. The runway alignment has been shown on the wind rose as a broken red line. A more northerly alignment would provide better wind coverage on the basis of the most recent 10 year of data.

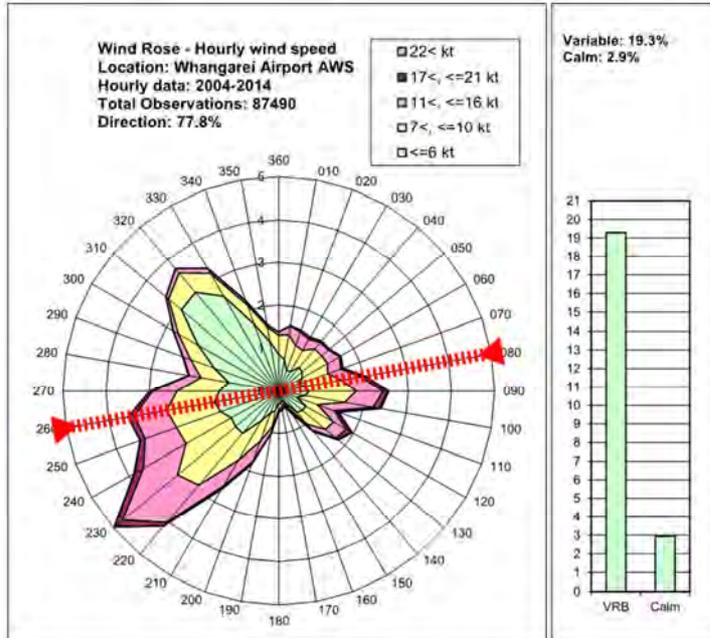


Figure 4.1 – Whangarei Airport Wind Rose (Data provided by the Meteorological Service of NZ Ltd.)

■ Grass Cross Runway 14/32

The grass Runway 14/32 is relatively short (475m) and is used by GA aircraft only. It is not suitable for use by passenger aircraft types operated by Air NZ.

Runway Strip

The Runway strip is a defined area including the runway, that is intended:

1. to reduce the risk of damage to an aircraft running off the runway; and
2. to provide obstacle protection for aircraft flying over the runway strip during take-off or landing operations.

The runway strip width is reduced below the minimum requirement of 150m for the last 200m of the strip at the eastern end due to encroachment of the adjacent roads and an embankment.

Runway Ends Safety Areas

The purpose of a Runway End Safety Area (RESA) is to provide an additional graded area beyond the runway strip for aircraft in the event of an overrun or undershoot occurrence. RESAs became mandatory in New Zealand for certificated aerodromes in 2006. Whangarei Airport, as with all other regional airports, was exempted from this requirement because it was not made mandatory for domestic aerodromes issued an operating certificate prior to 12 October 2006.

However, in accordance with CAR 139, any future modification to the runway that would extend the landing distance available (LDA) or runway strip greater than 15m will trigger the requirement for a RESA to be provided at each runway end. A RESA must extend a distance of at least 90m from the

end of the runway strip and “if practicable” between 90m and 240m. It is therefore highly unlikely that any meaningful lengthening of the runway could be undertaken without the installation of a RESA.

This is a significant issue for Whangarei airport as even the provision of minimum 90m long RESAs at the existing runway ends would require significant earthworks.

Electronic Navigation Aids

Electronic navigation aids at Whangarei Aerodrome provide a non-precision circling approach to the main runway on both bearings. There is a Non-Directional Beacon (NDB) installed on the airport along with co-located Distance Measuring Equipment (DME). Terrain reflections of the NDB signal causes the aircraft Automatic Direction Finder (ADF) bearing indicator to have excessive swings and thus a second NDB is installed at Springfield to assist in providing a stable navigation signal.

An RNAV (GNSS)¹⁵ non-precision approach is implemented as a straight-in instrument approach to Runway 06 and as an overlay for the circling NDB procedure.

Visual Navigation Aids

The airport has a low intensity runway edge night lighting system. The system can be pilot activated (PAL) with pilots transmitting pulses on the VHF frequency of 118.6 MHz. There is a Runway lead-in light system for the Runway 24 approach and terrain obstruction lights that are required to be operational for night operations due to the terrain penetrations of the airports Obstacle Limitation Surfaces (OLS) as discussed in Section 4.2.

A precision approach path indicator (PAPI) visual landing system is installed for both Runway 06 and Runway 24. This system provides pilots with visual information during landing relating their relative position to the optimum approach slope to the runway threshold. The PAPI is configured to ensure a safe threshold crossing height (TCH) over the runway threshold. The Runway 24 PAPI is not permitted to be used outside of 1 Nautical Mile (NM) from the runway due to terrain penetrating the OLS and PAPI obstacle protection surfaces.

A specific requirement of the Phase 1 Study was to clarify issues of threshold crossing height and runway length limitation for the use of Beech 1900, Dash 8-Q300, ATR and other similar sized aircraft. A separate study investigating these issues is included in Appendix C of this report. This study concluded that Whangarei PAPI Mean Eye Height (MEHT) should be retained at its current settings of 3⁰ and a MEHT/TCH of 50ft as there is no operational advantage to be gained in lowering these values. Refer to Appendix C for additional detail.

4.2 Airspace and Surrounding Topography

Role of Obstacle Limitation Surfaces and PANS OPS Surfaces

It is essential for the safe operation of aircraft in the vicinity of an aerodrome that obstacles are kept well clear of aircraft flight paths. ICAO has detailed a complex range of surfaces that define given volumes of airspace that are required to be free from obstacles. The CAA in AC 139-6 has reproduced the ICAO OLS with some minor changes for application at all aerodromes in New Zealand:

¹⁵ GNSS - Global Navigation Satellite System also commonly referred to as an approach procedure using Global Positioning System (GPS)

- Annex 14/AC139-6 Obstacle Limitation Surfaces (OLS)

The broad purpose of these surfaces is to define the volume of airspace that should ideally be kept free from obstacles in order to minimize the dangers presented by obstacles to aircraft, either during an entirely visual approach, or during the visual segment of the instrument approach.

- PANS OPS Doc 8168 Obstacle Assessment Surfaces (OAS)

These surfaces are intended for use by procedure designers for the construction of instrument flight procedures and for specifying minimum safe altitudes/heights for each segment of the procedure. The procedure and/or minimum heights may vary with aeroplane speed, the navigational aid being used and in some cases the equipment fitted to the aeroplane.

The surfaces of Annex 14/AC139-6 (OLS) are intended to be of a permanent nature. To be effective they should therefore be enacted in local zoning laws or ordinances or as part of a national planning consultation scheme. The surfaces established should allow not only for existing operations but also for safeguarding the ultimate development envisaged for each aerodrome. There may also be a need to restrict obstacles in areas other than those covered by the Annex 14 OLS if operational minima calculated by using the PANS OPS criteria are not to be increased thereby limiting aerodrome utilization.

Whangarei OLS

The Onerahi airport site has hills approximately 2km to the east, rising to about 200m height at a distance of 3.5km. Hills also exist approximately 5km to the west of the airport.

The airport’s OLS are significantly infringed to the north and east which therefore does not permit instrument approach procedures to be developed for Runway 24 (for landing towards the west). The terrain penetrates the Runway 06 approach, inner horizontal and take-off climb surfaces (for take-off to the east).

Runway 06 has an instrument approach (RNAV-GNSS RWY06) and thus requires an OLS for a “Code 2 Non-Precision Instrument Runway”. Although Runway 24 is classified as a non-instrument runway, given that it has night operations by aircraft over 5700kg (Beech 1900 and Dash 8-Q300) the dimension of its OLS as detailed in AC139-6 are the same as for a Code 2 instrument runway. These are shown in Table 4.1:

Approach OLS Dimensions	
Length of inner edge	150m
Distance from Threshold	60m
Divergence	1:6.6
Length	3000m
Slope	1:40

Table 4.2 – Whangarei Approach OLS Dimensions

As stated above the Runway 24 approach OLS is penetrated by rising terrain at 2km from the threshold. Likewise the Runway 06 take-off climb surface is infringed by terrain at 2km from the runway end. The circling guidance / runway lead in lights and terrain/obstruction lights along with the higher landing and take-off meteorological minima would appear to be the mitigations to permit

Instrument Flight Rule (IFR)¹⁶ and night operations at Whangarei given the significant terrain penetrations of the OLS.

4.3 Geology and Geotechnical Conditions

Geology

The Whangarei Urban Area geological map 1:25,000 (White and Perrin 2003) shows that the Onerahi airport site comprises volcanic soil and basalt rock overlying Omahuta sandstone of the Northern Allochthon (described as calcareous glauconitic sandstone and interbedded sandstone and mudstone), which is exposed around the coastline of the Onerahi Peninsula.

The geological map shows several landslide areas around the peninsular.

Geotechnical Conditions

Based on a walkover inspection, it is noted that a near vertical cut face some 8-10m high was formed at the eastern end of the runway strip when the runway was extended and the road realigned around the runway end. This face exposes volcanic soil/tuff material and appears stable at present, although instability of this face can be expected, in particular under earthquake shaking.

The ground contours appear to indicate instability of the slopes below the road on the north, east and south sides of the eastern end of the runway strip. Ground water seepage and sliding on the interface between the volcanic materials and the underlying Northern Allochthon materials (which are likely to be less permeable) are considered a likely mechanism of slope movement.

At the western end the runway strip formation appears stable with the slope of about 3 Horizontal to 1 Vertical and about 12m height, which is likely to be in volcanic soils. Below this upper road, the geological map shows a landslide in Northern Allochthon materials and this area is currently occupied by several houses.

¹⁶ IFR and night operation are operations conducted in low visibility conditions.

5 Existing Aircraft Operations

5.1 Passenger Aircraft Operations

Air New Zealand and its predecessor NAC has historically been the dominant regular passenger traffic (RPT) carrier through Whangarei Airport since commencing their domestic services to Whangarei in 1948. Ansett New Zealand is the only other RPT airline to have recently serviced Whangarei from 1991 to 1998. The 1999 Master Plan review was prepared partly in response to the withdrawal of Ansett and the pending replacement of the Metroliner III aircraft type with the Beech 1900 aircraft.

Currently all RPT operations through Whangarei are undertaken by Air NZ subsidiary airlines on two routes to the main centres of Auckland (AKL-WRE) and Wellington (WLG-WRE). The Auckland route is operated by Air Nelson using the Dash 8-Q300 aircraft and the Wellington route is operated by Eagle Airways using the Beech 1900D aircraft.

The current weekday Air NZ schedule operates four daily flights through Whangarei to Auckland and a single daily flight to Wellington. Weekend activity is limited to Auckland flights. Current RPT activity is summarised in Table 5.1 below. As reported in this table the current schedule generates approximately 3,328 annual aircraft movements with a capacity of 150,280 seats.

Route →	AKL – WRE - AKL	WLG-WRE-WLG
Day		
Saturday	3	0
Sunday	4	0
Monday	4	1
Tuesday	4	1
Wednesday	4	1
Thursday	4	1
Friday	4	1
Total Flights	27	5
Weekly Movements ¹⁷	54	10
Annual Movements	2,808	520
Total Annual Movements	3,328	
Aircraft Type	Dash 8–Q300	Beech 1900D
Passenger Seats per Aircraft	50	19
Weekly Seats (Arrivals + Dpts)	2,700	190
Annual Seats (Approximate)	140,400	9,880
Total Seats Available	150,280	

Table 5.1 – Whangarei RPT Flight Activity Sept. 2014 (Air NZ)

On 11 November 2014 during the preparation of this report Air New Zealand announced that the Beech 1900 service to Wellington would be withdrawn from April 2015.

Prior to this announcement Air NZ has indicated that they would continue to focus their operations on these two main routes and that the introduction of new routes to additional trunk domestic airports or secondary regional destinations is unlikely. The re-instatement of the direct Wellington

¹⁷ A “movement” is a take-off or landing operation. A single flight therefore generates two movements.

route is unlikely unless Air New Zealand believe that they can operate this route profitably using a Dash 8-Q300.

Given Air NZ's dominant position in the New Zealand regional market it is considered unlikely that another start-up RPT airline will commence operations into Whangarei in the near future. The possibility of an established domestic carrier such as Jetstar introducing services to Whangarei is also considered unlikely given their focus on the trunk domestic routes and unsuitability of their current aircraft fleet to operate from Whangarei's Code 2C runway.

5.2 Aircraft Performance from Existing Runway

Required Runway Length

The required "runway length" for a specific aircraft type can be split into two categories, runway length required for landing and runway length required for take-off. The required lengths will further be affected by assumptions around environmental conditions (wind speed and directions, temperature, precipitation) and the load condition of the aircraft. The load condition ranges from a "Maximum Certified Take-off Weight" (MCTOW) representing a full passenger, fuel and cargo load to something less with a "restricted" passenger and/or fuel and cargo load. The load condition is determined by the fuel load required to reach a specific destination, with an appropriate allowance for diversion and wind conditions, and the passenger/cargo required to sustain an economically viable operation.

What is stated as "required runway length" therefore encompasses a range of values depending on the assumed load, operational and environmental conditions. For the purpose of this report the runway lengths that have been stated relate to the required take-off runway distances unless stated otherwise. The take-off distances are the more demanding length, to operate with a full passenger load and necessary fuel load on the existing Auckland and Wellington sectors.

Existing Aircraft Type Performance

Both the Beech 1900D and Dash 8-Q300 are restricted from operating at their MCTOW from Whangarei due to the length of the runway. Both are however able to take full passenger loads on the Whangarei – Auckland sector.

The Beech 1900D has to restrict its payload on the longer sector to Wellington and at times due to adverse head winds and destination alternate requires passenger loads to be limited to 16 passengers.

The Dash 8-Q300 similarly is subject to operational restrictions under adverse weather conditions.

6 Existing Aerodrome Non-Compliance

There is a risk to the airports continued certification/operation due its non-compliance with three key points of the existing design standards. In summary these are:

1. Existing OLS infringement to the north and east means that minimum OLS to support both day and night operations cannot be achieved.
2. The runway strip width narrows down from 150m to only 100m at the eastern Runway 24 threshold. When night operations were implemented in the mid 1990s the largest aircraft operating into the airport was the EMB 110 Bandeirante, which has a MCTOW of below 5700kg. Aircraft below 5700kg only require a runway strip width of 90m for night operations. Since then the Bandeirante has been replaced by the larger Beech 1900 and Dash 8 Q-300 which, being over 5700kg MCTOW, require a minimum runway strip width of 150m.

The airline operators are required to comply with CAR 121.71(h) Appendix C. This requires 150m strip and for Code 3 aircraft all of the 150m must be graded.

3. The lack of minimum RESA of 90m x 90m.

To manage both the operational safety risk and the risk of losing CAR 139 certification the airport operator needs to detail the existing mitigations in place to manage the risk and have this as part of the formal justification for certification.

The existing mitigations include:

1. Circling guidance/lead in lights
2. Terrain limit lighting
3. Restriction of use Runway 24 PAPI only inside 1 nautical mile due to terrain
4. Special charts in AIP depicting night circling procedures
5. Special pilot training and aerodrome qualifications for current Air New Zealand Link airlines

The current draft CAR 139 NPRM does not trigger an immediate requirement for the aerodrome to re-apply for its certification. Nonetheless if the final ratified version of the CAR 139 NRPM requires full compliance for existing domestic aerodromes, these could be written up as a formal safety case and used as part of a formal exemption process. It is our current understanding from CAA that the NPRM will become effective in mid-2015.

7 Future Regional Aircraft Types

Given the dominance of the Air New Zealand in providing regional passenger services their fleet development plans are an important consideration in determining future infrastructure requirements.

The following quote is from Air New Zealand Chief Executive Chris Luxton which appeared in the Dominion Post article “Air NZ defends price of regional fares” on 1 October 2014:

“The reality is few airlines see the sense of servicing regional towns like we do, and consider it uneconomic.....So, the key for us is to up-gauge and get [regional] markets into larger aircraft to realise lower costs per seat to keep a downward pressure on prices. This is why we’ve spent close to \$200 million refurbishing our existing ATRs and ordering nine new ones”.

In line with this philosophy the Air New Zealand Group is currently increasing its ATR-72 fleet from 11 to 20 aircraft while reducing its Beech 1900 fleet which is due for retirement progressively over the next few years. On 11 November 2014, as a result of a “comprehensive review of our regional networks” Air NZ announced the following changes:

- Accelerating the introduction of new 68 seat ATR aircraft into our fleet allowing us to introduce additional capacity on routes currently operated by 50 seat aircraft (Dash 8 Q300), where sufficient demand exists
- Progressively winding down our 19 seat Beech aircraft operations and moving to larger 50 seat aircraft on routes where sufficient demand exists
- Suspending some regional services that are no longer economically viable to operate

With respect to this last bullet point, Beech 1900 services announced to be withdrawn in April 2015 included on the Wellington-Whangarei and Auckland-Kaitaia routes.

Given the average age of the Dash 8–Q300 (7.7 years) fleet it is anticipated that these aircraft will continue to be operated by Air New Zealand for the next 10-15 years. The other turboprop aircraft type that could be considered by Air NZ in the medium to long term is the Bombardier Dash 8-Q400, although Air NZ currently has no plans to procure this larger turboprop type.

It is also important to note that there is currently no aircraft being manufactured similar in size to the Beech 1900/19 seat type. Major aircraft manufacturers are instead concentrating on the 60-99 seat turboprop market for which their research indicates globally there will be far greater future demand. This includes consideration of new 90 seat turboprop types which Air New Zealand has is displaying a strong interest in.

In consideration of previous discussions with Air New Zealand, it is also unlikely in the medium to long term design horizon that they would:

- Undertake regional operations using their existing Code C jet fleet (Airbus A320s)
- Purchase “Regional Jets” for domestic operations such as the Embraer ERJ or Bombardier RJ series of aircraft.

This is largely due to the unfavourable economics of operating a jet aircraft on the relatively short regional sectors encountered in New Zealand. Our expectation of the make-up of the Air New Zealand regional fleet based the above commentary is shown Table 7.1.

Turboprop Aircraft			Likely Air New Zealand Fleet				
Type	Pax	Avg. Fleet Age yrs	Status	2014	+ 5-10 years	+10-20 years	+20-50 years
Beech 1900D	18	12.7	No longer in production	✈	X		
Dash 8 –Q300	50	7.7	No longer in production	✈	✈	✈/X	
ATR – 72 500/600	68	11.0 (500) 1.5 (600)	In production	✈	✈	✈	X
Dash 8 –Q400	74	N/A	In production			?	
ATR – XX	90+	N/A	Future Type			✓	✓
Dash 8 – 400X	90+	N/A	Future Type			?	?
Domestic/Regional Jet Type	40+	N/A	Existing types				?

Table 7.1 - Likely Regional Fleet Development

✈ - In-service X – Retired from service ✓ – Likely Future Type ? – Possible future type
Average fleet age from Air New Zealand website

This projected fleet plan was discussed with Air New Zealand whom for obvious commercial reasons would neither confirm nor deny its accuracy. However they did indicate that this scenario is a not unrealistic view of their future regional fleet development.

Regional Airport facilities in New Zealand therefore risk losing scheduled passenger services from Air New Zealand if they cannot cater for an ATR-72 sized turboprop aircraft in the medium term (10-15 years), when it is anticipated that the Dash 8-Q300 fleet is phased out, and possibly an even larger turboprop type beyond that time frame. The existing runway length at Whangarei is considered too short to support current ATR-72 operations and larger, more economical, future turboprop aircraft types.

It is also considered unlikely that the entrance of a new regional carrier into the market, that may only be able to operate older, smaller, less efficient aircraft, will be able to provide a competitive service to Air New Zealand from the current runway length.

8 Future Facility Requirements

8.1 Navigation Aids

The type of navigation aids, both electronic and visual, provided at an airport is dependent upon the level of service required by the airport, its air navigation service provider and the airlines. The landing meteorological minima for an instrument approach consist of two elements:

- The minimum descent height (height above the runway that the aircraft can descend to in cloud); and,
- The minimum visibility required for an aircraft to have sufficient visual reference for landing.

The lower the landing meteorological minima the greater the airport's operational availability is achieved by enabling aircraft to still conduct landings and take-offs in adverse weather conditions with low cloud and poor visibility.

Instrument precision runways require the installation of an Instrument Landing System (ILS), which provides both electronic glide slope and azimuth guidance, permits operations down to minimum descent heights of 200ft and visibility of 800m. An enhanced ILS and visual navigation lights, termed Category 3, can enable jets to landing in fog in visibilities down to 100m. No turbo-prop aircraft are certified for category 3 operations. In the future an enhanced GNSS termed GBAS (Ground based augmentation system) will replace ILS as the precision electronic navigation aid.

Most of the regional airports in New Zealand have instrument non-precision runways. Navigation aids consist of VOR/DME, NDB/DME or GNSS, combined with a low intensity runway lighting system to enable meteorological landing minima of 400ft – 500ft and visibilities of 1600m. The existing landing meteorological minimum at Whangarei are higher at 547ft and 2000m due to the terrain issues.

The existing non-directional beacons are dated technology navigation aids that are being phased out on a global basis. RNAV (GNSS) approach procedures have been developed at Whangarei however there are still restrictions in the CAR that limit GNSS as a sole means of navigation. The implementation of a VOR/DME could therefore be required to enable both NDBs to be withdrawn.

The navigation aids are owned and operated by the Airways Corporation of NZ (Airways). To date Airways has demonstrated a reluctance to undertake major CAPEX investment such as the likely cost of \$1.8 – \$ 2.2 million for the installation of a VOR/DME at the smaller regional airports.

Provision of VOR/DME could become a requirement at some point due to the NDBs becoming unserviceable. If this occurs then it is likely that Whangarei Airport will have to cover the cost of replacing this navaid. The NDBs are progressively being withdrawn however final dates are on hold pending the decision on whether GNSS can become a sole means of navigation within New Zealand airspace. Updated information on this issue can be accessed at <http://www.nss.govt.nz/>

To upgrade to an Instrument precision approach runway Category 1 would require the following: installation ILS; installation high intensity approach and runway lighting; and runway strip widening to 220m (Refer to following Section).

The OLS required for the instrument runway cannot be achieved at Onerahi due to terrain and thus this option cannot be considered for an upgrade to the existing aerodrome site.

For a “green-field” site it is recommended that for short term planning a non-precision instrument capability be installed to match the existing Onerahi capability. For medium to long term planning

safeguarding for a Category 1 Precision approach capability and enhanced GNSS approaches should be considered.

Considerations for the short to long term design horizon at a green field site are therefore:

■ **Visual Aids**

- PAPI, simple approach lighting system, low intensity runway and aerodrome lighting.
- Safeguard for upgrading to high intensity approach and aerodrome lighting systems to facilitate upgrading to a precision category 1 instrument runway.

■ **Instrument Aids**

- VOR, DME
- Safeguard suitable sites for ILS and/or the location of a GNSS/GBAS ground station.

8.2 Runway Configuration

Runway Length

In the consideration of the short to medium term planning horizon(+10-20 years), a minimum runway length of **1,200m for both landing and take-off operations**, with complying runway strip and RESA would provide the following capability

- Beech 1900D Unrestricted¹⁸ operations to Auckland and Wellington
- Dash 8–Q300 Unrestricted operations Auckland
 Restricted¹⁹ operations to Wellington
- ATR-72 Restricted operations to Auckland
 Not viable to Auckland or Wellington

An enhanced **take-off runway length of 1, 350m** could be provided by building 150m starter extensions at both runway ends. With complying runway strip and RESA this would provide the following capability:

- Beech 1900D Unrestricted operations to Auckland and Wellington
- Dash 8–Q300 Unrestricted operations to Auckland and Wellington
- ATR-72 Unrestricted load to Auckland
 Restricted operations to Wellington

¹⁸ “Unrestricted” means that the runway length is long enough for the aircraft to take of loaded with the maximum number of passenger, baggage load, freight load and sufficient fuel including reserves for the nominated sector. This may however be less than the aircraft MCTOW.

¹⁹ “Restricted” means that under unfavourable operational conditions (headwinds, crosswinds, temperature, precipitation, divert availability etc) there will be occasions when operating with a full passenger load on the nominated sector will not be possible. Passenger numbers will be limited on these occasions.

With respect to ATR-72 operations, operational restrictions on the Whangarei/Auckland sector for 1200m runway would only occur when weather at Auckland required fuel for a more distance alternate such as Napier or Palmerston North rather than the closer in airports like Tauranga or Hamilton. The need for extra fuel in these conditions would result in the possibility of off-loading 6 passengers giving a 91% load factor. Given that overall Air NZ domestic load factor is approximately 80% (source Air NZ monthly investor updates) there would in practice be few occasions (less than 1%) when actual passenger would need to be off loaded.

A likely similar operational restriction would apply on the Whangarei/Wellington sector from a longer 1350m runway.

A **1,410m** runway length would enable unrestricted operations to Wellington for the ATR-72 type. In consideration of a longer term (20-30 years) planning horizon, the minimum recommended length to cater for some future growth in aircraft types and to provide a greater operational capability for existing types at Onerahi would be **1,500m**. This would support unrestricted operations by larger existing turboprop types such as the ATR 72. However, as will be discussed in Section 9, we do not consider the provision of a runway length greater than 1350m runway at Onerahi to be feasible for aeronautical and engineering/cost reasons.

Notwithstanding the above at a “green-field” location, the long term (20-50 yrs) runway length that should be considered is a minimum of **1,700m-1800m** to allow for:

- Unrestricted operations by all existing regional turboprop types
- Operations by future 90 seat turboprop types
- Freight operations by Code C jet and turboprop types
- Domestic passenger operations by Code C jets
- Domestic and international charter operations by larger Code C types (ie B737-800/900 and executive jet types)

With respect to Code C jet operations it is important to safeguard this capability for possible future charter and freight operations and given the uncertainty around future aircraft development when considering a 50 year design horizon

Runway End Safety Area

As noted in Section 4.1 reconfiguring the runway will trigger the requirement for a RESA. The minimum allowable RESA length is 90m and the recommended length is 240m. This length must be provided beyond the end of the runway strip which extends 60m beyond the runway ends. The length of RESA to be installed with a runway re-configuration at Onerahi would need to be agreed with the CAA as part of the re-certification of the runway.

In consideration of the following:

- Operations limited to Code B and C turboprop types – no jet aircraft operations;
- Costs of runway/RESA extensions to be prohibitive;
- Certification of 90m RESAs at a similarly constrained aerodrome with Code C jet operations;

we believe that there would be a strong case to argue for a 90m RESA to be provided for at the existing aerodrome site.

The length of RESA to be allowed for at a “green-field” site will likely be longer than the minimum recommendation of 90m as RESA length would be an important consideration in site selection. It is unlikely that the CAA would take a favourable view of the selection of a new site that only allowed for a minimum RESA length. An appropriate range for planning would be 120m-240m.

Runway Strip

The runway strip extends 60m past the runway end. The runways strip width recommendation differ between what is specified in the current CAA AC139-6, which differentiates between Code 2&3²⁰ “domestic” and “international” aerodromes, and what is specified in ICAO Annex 14 as shown in Table 8.1.

Runway Designation	Total Runway Strip Width (m)	
	ICAO Annex 14	CAA AC 139
Existing Situation Code 2 Non precision approach	150m with < 150m at last 200m of eastern runway end	
Code 2 Non precision approach	150	150m Domestic 150m International
Code 3 Precision approach	300	220m Domestic 300m International
Code 3 Non precision approach	300	150m Domestic 150m International
Code 3 Non Instrument	150	150m Domestic N/A International

Table 8.1 – Runway Strip Width Requirements

Any lengthening of the runway at Onerahi would need to provide 1200m to be operationally justifiable. This will result in a Code 3 runway length. As a minimum the runway strip will need to be widened to provide 150m along its full length for a non-precision approach.

A “domestic” precision approach capability would require the strip to be widened to a total width of 220m. This would require major reconfiguration of the taxiway and apron areas and the relocation or demolition of the hangars particularly to the west of the terminal. The terminal building may also need to be modified in consideration of the reconfigured apron. More significantly a 220m strip would also require a larger platform be constructed to both the eastern and western runway ends. We do not believe that the additional operational capability provided for by a 220m strip/precision approach runway justifies the additional engineering works and associated costs.

²⁰ A “Code 3 runway is a runway with an Aeroplane reference field length of length of 1200m up to but not including 1,800m.

For consideration at a green-field” location, the long term (20-50 years) we recommend that a Code 3 runway strip of 300m be considered for conceptual planning in consideration of the following:

- This allow for the possible increase in future strip requirement if the CAA adopt the ICAO recommended values for domestic precision approach operations;
- Given the long term planning horizon (+50 years) a 300m strip also allow for international precision approaches.
- The provision of a 300m strip in conceptual planning of a new site safeguards airside areas for terminal and apron development;
- If a preferred site is identified that scores highly on most criteria other than the provision of a 300m strip width, there is the potential to relax the criteria to 240m understanding that this will reduce the flexibility for future long term airside development.

Runway Configuration Summary

Table 8.2 summarises the recommended runway configuration and associated capability for aerodrome planning at Onerahi or alternatively at a “green field” sites.

Planning Horizon	Runway Length (m)	RESA Length (m)	Rwy Strip Width	Runway Classification/Operational Capability
Existing Onerahi Site	1,097	0	Generally 150 At Eastern End 150-120	Runway: Code 2C Non-precision instrument approach Beech 1900D AKL – unrestricted operations WLG – restricted operations Dash 8–Q300 AKL – unrestricted operations WLG – restricted operations ATR-72 AKL – Not viable WLG – Not viable
Medium Term (10-20 years) Onerahi Site	1,200	90	150	Runway: Code 3C Non-precision instrument approach Beech 1900D AKL – unrestricted operations WLG – unrestricted operations Dash 8–Q300 AKL - unrestricted operations WLG – restricted operations ATR-72 AKL – restricted operations WLG – Not viable
Medium Term (10-20 years) Onerahi Site	1,350	90	150	Runway: Code 3C Non-precision instrument approach Beech 1900D AKL – unrestricted operations WLG – unrestricted operations Dash 8–Q300 AKL - unrestricted operations WLG - unrestricted operations ATR-72 AKL - unrestricted operations WLG – restricted operations
Medium Term (10-20 years) Green Field Site	1,500	120 to 240	300	Runway: Code 3C Precision approach instrument Beech 1900D AKL - unrestricted operations WLG - unrestricted operations Dash 8–Q300 AKL - unrestricted operations WLG - unrestricted operations ATR-72 AKL - unrestricted operations WLG - unrestricted operations
Long Term (20-50 years) Green Field Site	1,700 to 1,800	120 to 240	300	Runway: Code 3C Precision approach instrument Allowance for: Unrestricted operations by existing regional turboprops Operations by future 90 seat turboprop types Freight operations by Code C jet and turboprops Domestic passenger operations by Code C jets Domestic and international charter operations by larger Code C jets and executive jet types

Table 8.2 – Existing and Recommended Future Runway Configuration

RED Text = operations not viable ORANGE Text = restricted operations GREEN Text = unrestricted operations

Refer to footnotes on Pg 24 for definitions of “restricted” and “unrestricted” operations

8.3 Air Traffic Services

The Civil Aviation Authority has taken a more proactive stance in determining the CAR-139.113 requirements for establishing aerodrome air traffic service (ATS) as demonstrated by Paraparaumu having to implement an Aerodrome Flight Information Service (AFIS) prior to permitting scheduled Dash 8-Q300 services. The CAA policy paper, "The Provision of ATS at Aerodromes, August 2005" is still current.

This paper states that a threshold of 40,000 aerodrome movements or 7,500 Instrument Flight Rules (IFR) movements would require the aerodrome operator to establish an AFIS. The current scheduled IFR movements by Air New Zealand flights to Whangarei are approximately 3,328 per annum. The IFR movements by non-scheduled and training flights need to be monitored to ensure the implementation of AFIS can be managed on a timely basis if required.

8.4 Airport Rescue Fire

The Dash 8-Q300 is the largest aeroplane type regularly operating to the aerodrome and as such is used as the basis of determining the Airport Rescue Fire Category. The current schedule has 54 Dash 8-Q300 movements per week. Therefore during the busiest 3 consecutive months of the year is approximately 700 movements. This is the trigger for a domestic airport to establish a Category 3 rescue fire-fighting capability as per CAR 139.59 (c)(2).

This requires obtaining a rescue fire vehicle with the following:

- minimum water/foam capacity of 1200l and minimum discharge rate of 900 litres/minute
- Dry chemicals capacity of 135kg

Currently Air New Zealand are re-configuring their regional operations and it is quite possible that there will be increased Dash 8-Q300 activity at Whangarei in the coming year. WDC therefore needs to consider the provision of a Category 3 rescue fire facility as soon as possible to support current operations, and any possible increase in future Dash 8 movements.

Given the changes to CAR 139 that are under way there is also the possibility that the rule would move closer to the ICAO Annex 14 requirement which is more demanding. Future planning should therefore consider provision for establishing a Category 5 Airport Rescue Fire Fighting capability which requires a significantly larger response vehicle.

9 Onerahi Aerodrome Development

With respect to the provision of supporting facilities, such as the terminal, apron, ARFF, car parks, hangers etc., it is considered that there is sufficient area adjacent to the existing facilities to construct new and/or expanded existing facilities to meet future requirements. The costs to upgrade these facilities, whilst considerable, are not significant in comparison to the likely cost to lengthen the main runway. The District and Regional Plans and construction cost issues are therefore the key strategic issues that must be addressed to ensure the continued viability of an Aerodrome at the current Onerahi site.

9.1 Runway

Navigation Aids

As previously noted the OLS required for the instrument runway cannot be achieved at Onerahi due to terrain and upgrading the runway navigational aids can therefore not be considered. For future planning it is therefore assumed that the existing non-compliant non-precision approach will be maintained.

We note that any extension of the runway would likely require the airport to undertake some form of approval process from the CAA. Without a complying OLS, and hence instrument procedures; there is a risk that the runway will not be re-certified by CAA for non –precision approach procedures. This would represent a reduction from the current operational capability, for example losing approvals for night operations.

Runway Length

It is considered that in the medium term, 10-20 years, the Beech 1900D will certainly be phased out given the start of its withdrawal next year and the Dash 8-Q300 will also very likely have been replaced by the ATR-72 or a similar larger turboprop type. To remain viable the airport will therefore need to provide a runway facility suitable for operating these larger turboprop types to Auckland and Wellington or risk losing one or both of these routes. This ATR-72 requires a minimum landing distance of 1,200m and a take-off runway length of 1,200m to 1,350m. The longer take-off distance providing for a full passenger load to Wellington under most conditions with the ATR-72. As discussed later in the report the construction cost differential between a provide 1,200m and 1,350m for take-off is not significant.

Lengthening Direction

- Eastern End

The runway category to support future Code C turboprop aircraft operations in consideration of Air NZ fleet plans is a Code 3 non-precision instrument runway with the required associated OLS extending out to 15km. The current OLS terrain penetrations to the east of the runway do not permit compliant OLS to be implemented.

Thus no extension to the current runway to the east is considered feasible given that the terrain penetrations commence at only 2,000m from the runway threshold.

Also as discussed in Section 3.3 the marine area to the east is a protected marine management area and reclamation in the area will require a plan change to the Regional Coastal Plan.

- Western End

The main Whangarei shipping channel passes by the western side of the Onerahi peninsula, the approximate alignment is marked on Drawing 3232530-CK002. The shipping channel provides

9.0m of water depth at low tide with the adjacent tidal mud flats approximately 1.0m above low tide level. Any extension beyond what is currently shown on the drawing would very likely require the re-alignment of the channel and 9.0 – 10.m of dredging. Any extension to the west would require further detailed investigation into this issue and its potential effects on the marine environment.

Also as discussed in Section 3.2 the marine area to the east is a conservation marine management area and reclamation in the area will require a plan change to the Regional Coastal Plan.

RESA

The provision of RESAs is necessary at both ends of the runway and will require a substantial volume of earth fill at both ends extending past the existing coast line. We consider that a strong case could be made to the CAA to provide only the minimum 90m RESA length given the engineering difficulty and cost to construct additional runway platform area at this site.

Runway Configuration

Drawing 3232530-CE-K010 shows the recommend configuration to provide a 1,350m Code 3C non-precision instrument approach runway.

In order to provide the 1,350m for take-off the following works are required to the runway:

- Provision for a 150m wide runway strip
- A runway extension 100m to the west. This allows for the Runway 06 threshold to be relocated by a similar distance to provide an increased Landing Distance Available (LDA) for both runways of approximately 1,200m.
- 150m Starter Extensions²¹ to be constructed at both runway ends to increase the Take-off Runway Available (TORA) for both runways to 1350m. Starter Extensions are permitted in the runway strip end and RESA areas. Started Extension do not provide additional landing distance.
- A 90m RESA to be provided at both runway ends.

The runway platform must be extended in both directions beyond the existing coastline to accommodate the new runway configuration.

A runway configured to provide a shorter 1,200m take-off runway would not result in a significant construction cost reduction because lengthening the runway by 100m to provide 1,200m for landing would still trigger the requirement to provide a minimum 90m RESA at both runway ends. In the 1,350m runway scheme this area is utilised for starter extensions to provide the additional take-off distance.

²¹ A starter extension may be established where additional take-off distance, take-off run or accelerate-stop distance is required but physical limitations do not allow provision of the mandatory runway or strip width.

9.2 Construction Cost Estimate

A Rough Order cost estimate of **\$140 Million** has been made of the potential development described above based on the following allowances and assumptions:

- 1.65 million cubic metres of fill required
- 100m runway extension, 150m starter extensions at both ends
- 90m RESA
- Seawalls at both ends
- Ground stabilisation
- Tunnel at west end upper road
- Road diversions at both ends
- Purchase of 40 properties
- Miscellaneous site works
- Contractors general items (P&G) and consultant fees
- 30% contingency

This estimate is not based on any engineering concept design and is therefore considered likely to be accurate to +/- 30%. (**\$100 - \$182 Million**) The estimate is also sensitive to the cubic metre rate of bulk fill, which will be subject to commercial issues. Geotechnical site investigation, concept design and investigation into potential fill sources would be required to provide a more accurate estimate. No allowance for escalation has been made.

A breakdown of this cost is included in Appendix D of this report.

The cost saving associated with a shorter 1,200m runway project would be minimal, in the order of **\$3 - \$3.5 Million** for the reduced pavement and lighting works.

9.3 Planning and Environmental Issues

Operative Whangarei District Plan 2007

Only minor extensions at the ends of the existing runway could be accommodated within the existing designation. The land required to accommodate the additional length for a 1350m long and 30m wide runway would encroach outside the designation boundary (covered by the purple hatch in the Figure 3.1) into the Open Space Environment (green area) and residential land.

An extension of the main runway to the east or west beyond the existing airport boundary would require an alteration to the designation, given it would encroach onto zones in the District plan that do not provide for airport activities.

Section 181 sets out the rules in relation to alteration of a designation. If it is anticipated that Onerahi would be expanded to meet future demands, an alteration to the existing designation boundary pursuant to section 181 of the RMA will be required.

As a condition of the Aerodrome designation, the airport is required to operate within the existing noise contours as shown on the District Plan maps. These noise contours are based on the existing runway length and would require re-visiting as part of any alteration to the designation under s 181 of the RMA.

Should an alteration to the designation be pursued, in addition to the noise contours, it would need to address a range of activities and effects associated with the airport including:

- Land purchase of the residential areas to the west of the airport (Kaiwaka Point), including negotiation with private owners and/ or compulsory purchase under the Public Works Act.
- Alteration to the existing apron footprint, or creating an additional apron, to accommodate the larger aircraft.
- Expansion of car parking spaces
- Expansion of the building and activities on site
- Access roads and internal works
- Associated ancillary activities to facilitate construction such as landscaping, earthworks and infrastructure.

It is considered that the key issues associated with an alteration to the designation would be:

- Noise effects - the change to the noise contours and any resulting impact on noise nuisance and property rights.
- Land purchase required – in particular of private residential properties
- Iwi/hapu concerns and any impact on the Treaty Settlement process.

It is considered that the alteration to the designation would be publicly notified and would be a 'challenging' planning process. We would estimate that this process including preparation of technical material, public and stakeholder consultation and the hearing process through to decision could take two years.

Noise capacity remaining

Recent noise monitoring by Marshall Day indicates that there is excess capacity in the current noise contours. However, as the contours following the main runway (east-west direction), and the future extensions (and flight path) would largely extend either over coastal areas or areas required to be purchased, there may not be a significant number of additional landowners affected by the new contours.

Any change to an airport's notified noise contours would likely receive significant public interest.

Iwi/Hapu consultation

We would recommend early engagement with iwi/hapu. Reclamation into the coastal marine area is not usually favoured by iwi/hapu. Early meetings with Council officers indicated that runway extensions into the coastal marine area at Onerahi would likely receive significant opposition from iwi/hapu.

Regional Planning Issues

Currently the Regional Coastal Plan for Northland does not provide for an application to be made for the reclamation required for the runway extension to the east. We would anticipate that any resource consent application for the runway extension to the west would be publicly notified and would require a substantial assessment of the economic, social and environmental benefits and costs of the project, including an assessment of alternative methods and locations. Northland Regional Council is currently reviewing all their regional plans, including the Regional Coastal Plan. This provides an opportunity to address the rules relating to reclamation in the Marine Management 1 zone as part of the future plan review process, rather than as a separate plan change. It is recommended that WDC engage with NRC as to the timing and process of the review of the NRCP.

10 Summary and Recommendations

The existing Onerahi aerodrome site encompasses sufficient land for the development of landside, terminal and apron infrastructure to support aviation activity for the foreseeable future. It is also considered likely that there is sufficient capacity in the existing single runway system to support future growth beyond 30 years.

The major issue which undermines the medium to long term viability of the airport at the Onerahi location is the ability to lengthen the existing relatively short existing runway. A runway lengthening project is considered necessary to meet the requirements of the evolving Air New Zealand regional fleet, and provide an operational capability suitable for likely future aircraft types. A secondary, but significant issue is the ability for the airport to maintain its current operational capability given the existing non-compliances at the aerodrome. These non-compliances may need to be addressed with the adoption of a Civil Aviation Rule 139 Notice of Proposed Rule Making (CAR 139 NPRM) anticipated in 2015 or as part of the certification of a reconfigured runway.

Based on the likely regional fleet development of Air New Zealand, for the airport to remain at its current location in the next 10-20 years will require a minimum runway lengthening to 1,200 to 1,350m to facilitate turboprop operations by 68+ seat aircraft such as the ATR-72 on the existing core Auckland and Wellington routes. A rough order cost for the 1,350m runway utilising “starter extensions” has been estimated at **\$140 Million**. A shorter, less capable 1,200m runway would require the same runway platform to be constructed to comply with Civil Aviation Authority (CAA) runway strip and Runway End Safety Area requirements and would not cost significantly less. Cost saving would be in the order of only **\$3-3.5 Million**.

In addition to a prohibitive cost, a runway lengthening project would also require the successful navigation of some significant regulatory issues including:

- Alteration to the designation of adjacent land under the Operative District Plan 2007. It is considered likely that this would be notified.
- Probably strong iwi/hapu and community objection to reclamation in the coastal marine area
- Regional planning issues
- CAA approval process

Recommendation:

We believe that the prohibitive costs and risks noted above outweigh any benefit of remaining at the current Onerahi site beyond a 15 years period. On that basis we would recommend that the Council:

- Plan to cease regular passenger traffic operations at the Onerahi site in the next 10-15 years
- Identify and secure an alternative site for future aerodrome as soon as possible, as scoped in next phase of this Strategic Study
- Establish a timeline/strategy for the construction and commencement of operations at an alternative site. The timeline will aim to deliver a new operational facility by approximately 2025
- This strategy could include a “gate” for triggering design development subject to a reassessment of regional aircraft fleet facility requirements at 2020 to confirm the “go-live” date for the new facility.