

# NORTH SHORE AIRPORT MASTER PLAN



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Revision  
1.20  
22 June 2020

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# 1 Introduction

## 1.1 Overview of the Airport

North Shore Airport is a vibrant regional facility located in Dairy Flat, 25 minutes north of the Auckland CBD. The airport is wholly owned and operated by North Shore Aero Club Inc.

The airport caters to a wide range of flight and non-flight activities. Aviation related activities include:

- Scheduled commercial flights
- Charter flights
- Training flights
- Tertiary education
- Emergency rescue flights and services
- Private general aviation, including from private sites at the adjacent Aeropark
- Engineering facilities
- Freight distribution
- Manufacturing
- Support and administration

The airport was originally established as a facility for the club to operate its aircraft from on a recreational basis, but has grown significantly since its inception more than 55 years ago.

As of 2019 there are 200 aircraft based at the airport, and more than 100 tenants in the commercial and private airport occupancies. NSA is a vital piece of regionally significant infrastructure providing links to provincial New Zealand from a strategic location close to State Highway 1 in the north of Auckland.

## 1.2 Purpose of the Master Plan

North Shore Airport (NSA) is wholly owned by North Shore Aero Club Incorporated (NSAC), the primary objective of which, in accordance with its constitution, is to promote and encourage aviation in every way.

As such, some of the key objectives of this Master Plan are to acknowledge the future aviation investments required for the airport and provide the steps to achieve them. This will ensure the long-term future of NSA is sustainable, and meets the needs of NSAC members, airport users, and the surrounding community.

Airports are an essential service provider in the modern world with immense social and economic value. However, by their very nature they also have social, economic and environmental impacts which tend to be more visible than their positive attributes.

Flexibility and provision for expansion is an essential part of airport master planning. While the expansion of some infrastructure means a step change in capacity and investment, there can be many operational initiatives and minor investments that progressively enhance capacity of existing infrastructure before the next step change is necessary.

In providing for airport upgrades, each project will be designed to minimise the impact on airport operations and the surrounding community. An important part of this is establishing good relationships with the local and wider Auckland community so the visible value of the airport outweighs any adverse effects.

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### **1.3 Methodology and Consultation**

This Master Plan has been developed by the officers of the North Shore Aero Club, with significant input from the operational management team. Its first draft was released for consultation within the Aero Club in January 2019.

### **1.4 Report Structure**

This Master Plan has been written in a format aligned to the Airport Master Planning Good Practice Guide 2017, published by the NZ Airports Association. The key elements of the Master Plan are as follows:

- Establishing the current capabilities of North Shore Airport
- Predicting the airport growth
- Providing a development plan to cater for forecast growth
- Aspects of development implementation

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## 2 Master Plan Context

### 2.1 Site Description

NSA is built on a large, relatively flat area east of Dairy Flat village. The airport sits at 60m above sea level, however the land at the northern corner of the site rises to 70m above sea level. The airport has a 690m road frontage to Postman Road.

The land holdings comprise an area of 27.1084 hectares. The legal description of the lots that make up the airport are: Lots 1-3, DP 80783; Lots 4 & 5 DP66352; Lot 9 DP324993; Lot 86 DP480346.

NSA currently has two operational runways:

- **03/21** – concrete (791m long, by 9m wide), grass (791m long, by 60m wide). The grass is used in the drier months for take-off and landing by light aircraft
- **09/27** – gravel (560m long, by 9m wide), grass (570m long, by 60m wide)

Various hangars and aeronautical businesses occupy a number of buildings in the north-west corner of the airport. Taxiway Alpha connects this area to Runway 03/21. This taxiway also connects the NSA terminal, offices and NSAC clubrooms to Runway 03/21.

The terminal has direct access to Postman Road with approximately 50 parking spaces adjacent to the terminal. The current road reserve can also accommodate another 30 parking spaces. There is an extensive hardstand apron area in front of the terminal and the neighbouring club hangar to accommodate aircraft and helicopter parking, pickup and drop-off.

On the south-eastern side of Runway 03/21 are a number of leased hangars. These generally have individual aprons and are accessed by a dedicated taxiway from Runway 03/21.

The underlying geology comprises a layer of medium dense silty gravel around 300mm thick on average, then firm to very stiff silts and clays around 900mm thick on average, all underlain at an average depth of 1,200mm by Mahurangi Limestone of the Northland Allochthon.

### 2.2 Airport Surroundings

North Shore Airport is located adjacent to the Northern Motorway, just 25 minutes north of the Auckland CBD. It can be reached in 6 minutes by road from the Northern Motorway's Silverdale interchange, allowing direct transport links to the Hibiscus Coast, the North Shore, and western suburbs north of Auckland Harbour Bridge.

The surrounding area is typically pastoral land and lifestyle blocks, with the exception of the Aeropark to the east, which comprises a large lot residential subdivision with parking for private aircraft and access via taxiways to North Shore Airport.

The Aeropark subdivision is partially complete with new dwellings being constructed. All properties within the Aeropark are subject to a 'No Complaints Covenant' which seeks to ensure current and future owners recognise the presence of the airport and do not seek to limit its operation.

Beyond the Aeropark lies the BP motorway service centre and the Northern Motorway (SH1). Further afield to the north east, the East Coast Bays Road ridgeline extends to 115m above mean sea level. This ridgeline provides a natural topographic constraint for aircraft take offs to, and landings from, the north-east.

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Extensive development of land for residential, business and industrial use occurs to the north within the Orewa, Silverdale, Millwater and Wainui areas.

## 2.3 Historical Background

The first flights from Dairy Flat Airfield, as it was called back then, were in 1957 or 1958. In those days, the airfield was merely a grass paddock with a runway strip mown into it.

NSAC came into being in 1963 when the founding members officially incorporated the NSAC. Due to ponding on the runway, the original grass runway strip was only usable through part of the year, with operations relocating to Ardmore during the winter months.

The first major improvement came with an upgrade to a limestone strip allowing operations to continue deeper into the winter. This was in turn upgraded to an asphalt strip to provide all weather capability. In 1992 the runway was upgraded to concrete.

In 2013 Dairy Flat Airfield became North Shore Airport (NSA) to reflect its unique location and regional significance in the fast-growing north Auckland area.

## 2.4 Regional Context

NSA is a significant piece of regional air infrastructure for the following reasons:

1. Auckland is currently served by three commercial airports;
  - Auckland International Airport (NZAA), Ardmore Airport (NZAR) and NSA (NZNE)
  - NZAA is situated in the southwest corner of Auckland with passengers from the north having to traverse Auckland, often with lengthy journey times.
  - NZAR is situated 30km ESE of Auckland CBD by road. Due to its location, it operates as a general aviation airport, serving the south of Auckland. It is not easily accessible to the motorway system.
  - NSA (NZNE) is the only commercial and general airport situated to the north of Auckland, servicing one third of the Auckland population. The government confirmed in September 2019 that Whenuapai airport, the only other northern airport, will maintain its defence role for the foreseeable future. The underlying zoning of Whenuapai is residential.
2. NSA is a key component of the transport infrastructure for Great Barrier Island with regular flights providing lifeline services to the island. Auckland Council documentation for 2018 sought authority for Auckland Transport to administer the affairs of Claris (NZGB) and Okiwi (NZOX) airports. Both of these small airports were noted as strategic transport infrastructure.
3. North Shore Airport provides an essential home for general aviation and charter aircraft, and is a large provider of flight training for students in the greater Auckland area and internationally.
4. As shown in Figure 1, North Shore Airport will have direct links to the Northern Motorway and a future rapid transit route in the next 20 years. This is because the land surrounding the airport will be developed for business use. This area has had a draft structure plan released by Auckland Council, which proposes business, light and heavy industry zoned land for the land surrounding the airport.



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The future alignment of public transport routes and urban roads is crucial to North Shore Airport's ability to fulfil its role in the regional economy, and to service a projected population north of the Harbour Bridge of 1 million people within the next 30 years.

5. The airport cannot be replicated elsewhere in the Auckland area. The topography of Auckland means the establishment and construction of any new airport to the north of Auckland would be almost impossible due to the lack of suitable land in the extremely hilly surrounding areas that are also constrained by sea boundaries.

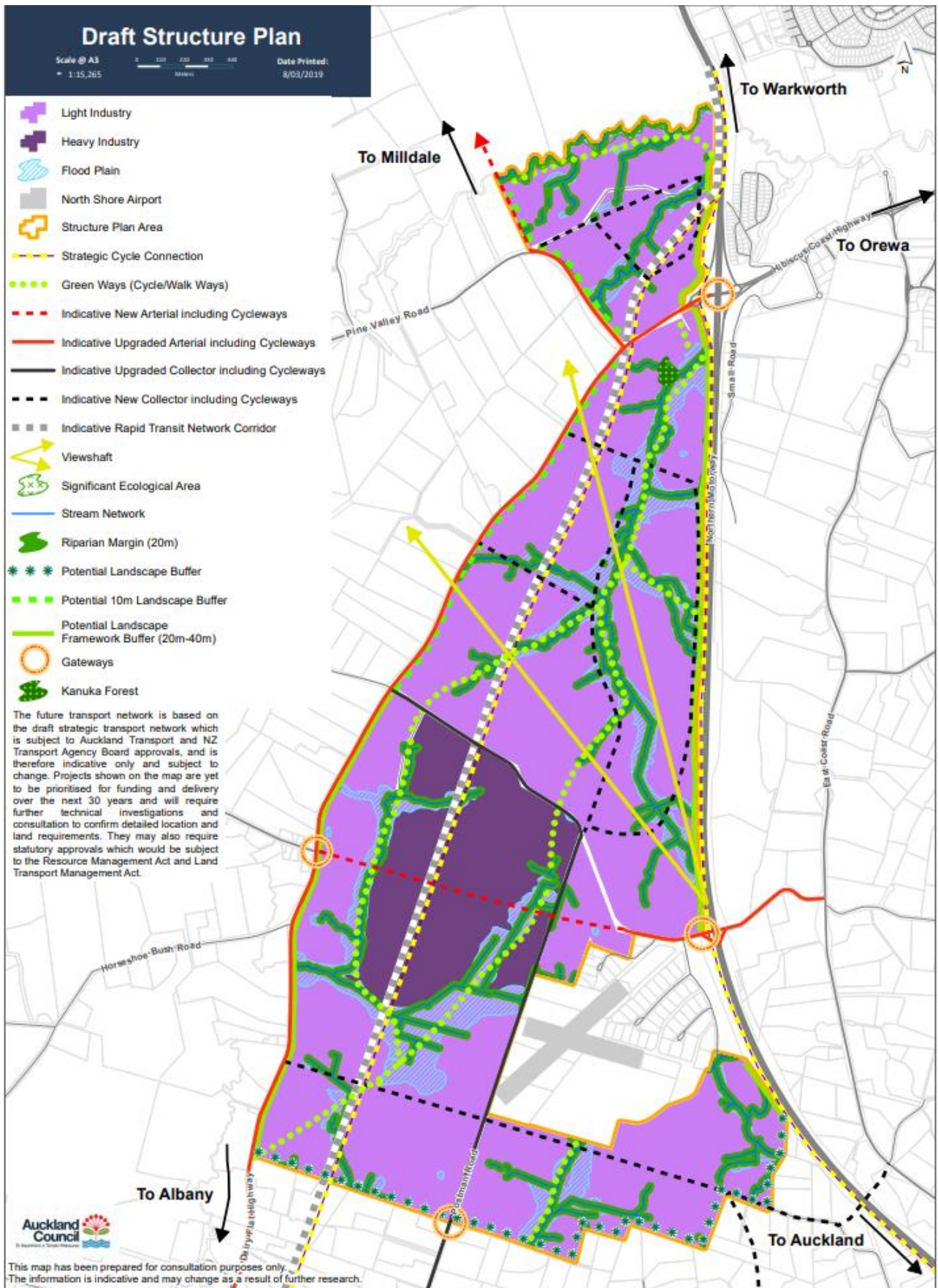


Figure 1: Draft Structure Plan map for the Silverdale West Dairy Flat Industrial Area

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## 2.5 Socio-economic Context

With Auckland Council planning to accommodate around 1 million extra people in Auckland by 2040, and one of the largest rural to urban developments ratified by Auckland Council occurring in the Dairy Flat region, the population within a reasonable commute to the airport is expected to grow by approximately 400,000 in the next 20 years.

Statistics NZ has shown a growth in the northern Auckland electorates in the five years between the 2013 and 2018 censuses of 49,000. New suburbs in the north comprise areas of Wainui, Millwater, Silverdale, Long Bay, Albany, Kumeu, Riverhead, Hobsonville and Red Hills. Areas to be developed include parts of Warkworth, Dairy Flat, and new parts of suburbs listed above.

Intensification of existing residential areas will provide similar population increases to those greenfield areas within the airport's catchment area. Given the current and projected population increase for the north of Auckland, and drawing parallels to provincial towns, this means an airport comparable to Hamilton will be required in the North of Auckland in the next 20 years.

Currently the land use immediately surrounding most of the airport is lifestyle blocks with a small business area at Dairy Flat village. However, this will change under Auckland Council proposals to re-zone the area around the airport to business land (see Figure 1).

The net developable area to be re-zoned for business under the Dairy Flat/Silverdale Structure Plan Business is 350ha (floodplains and roads removed). Of this, 294ha is identified for light industry, with 56ha for heavy industry. This amount of land is likely to provide for approximately 18,000 jobs, not including any increase in employment at the airport. Given their proximity to the airport, these future employment opportunities could also be aviation focussed and include aviation technology, logistics and possibly tourism.

North Shore Airport is a key stakeholder in the local community, and is the base for Northland Emergency Services Trust (NEST) helicopter. The airport is also a strategic link and necessary location for other emergency services. It is often used by Westpac Rescue, Police and other EMS services for patient transfers. These services often re-fuel at the airport.

As the population of Rodney and North Shore continues to increase the demand for the activities the airport facilitates will increase proportionately. The airport's economic importance will increase, as will its value to the community.

The airport's locational advantage means the population north of the central city can access it far quicker than Auckland International Airport. Currently vehicle commuting times from Orewa to Auckland International Airport range between 45–90 minutes by car, or more depending on the time of day. The journey to North Shore Airport is around 7 minutes from Orewa and 25–35 minutes from the Auckland CBD.

Any population increases in the vicinity of the airport can however, adversely affect its operation. This is widely recognised throughout the world, as detailed by the Australian National Airports Safeguarding Framework.

To be of continued value to the community and the future population of Auckland, the growth of the surrounding area needs to be managed according to such guidelines, with future-proofing of the airport enabled.

## 2.6 Regulatory and Policy Context

There are a number of regulatory rules and guidance which airports are required to operate under or have reference to. How NSA interacts with each of the main contributing statutes and regulations is described

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below.

### **Civil Aviation Act 1990**

The relevant regulations in New Zealand are the Civil Aviation Rules (CARs). CAR Part 139 prescribes the requirements for aerodromes used in air transport operations, in accordance with ICAO Annex 14 — Aerodromes.

North Shore Airport is not currently certificated under CAR Part 139 and it does not currently need to be. However, certification under CAR Part 139 will be pursued in the future as implementation of the Master Plan progresses. Any future development will be conducted in accordance with Part 139 and associated Advisory Circulars to facilitate ease of certification in the future.

### **Airport Authorities Act**

The Airport Authorities Act 1966 provides a process to become an Airport Authority. North Shore Airport is not currently an Airport Authority. An Airport Authority is empowered to:

1. Establish, improve, maintain, operate or manage an airport on any land, whether or not the land is wholly or partly owned by the Airport Authority
2. An Airport Authority can establish bylaws
3. An Airport Authority gives leasing powers to airports and allows an airport to terminate a lease if an affected property is required for airport purposes
4. Operational areas of the aerodrome are non-rateable under the Local Government (Rating) Act 2002

### **National Airports Safeguarding Framework**

At the present time New Zealand does not have any equivalent of Australia's National Airports Safeguarding Framework. However, this framework is routinely used as guidance for NZ airports and local authorities to manage the impacts of aircraft noise, turbulence, bird strikes, lighting and intrusions within and surrounding airports. The framework guidelines can be accessed here:

[https://www.infrastructure.gov.au/aviation/environmental/airport\\_safeguarding/nasf/nasf\\_principles\\_guidelines.aspx](https://www.infrastructure.gov.au/aviation/environmental/airport_safeguarding/nasf/nasf_principles_guidelines.aspx)

The other relevant standard is NZS 6805:1992 Airport Noise Management and Land Use Planning. This is still used for managing airport noise and the interface with other land uses.

The development of the Master Plan has referenced the National Airports Safeguarding Framework and NZS 6805.

### **Local Authority Planning**

The Resource Management Act 1991 (RMA) is the New Zealand Government's central piece of environmental legislation. Many aspects of the RMA legislation are given effect to through the Auckland Unitary Plan (Operative in Part) (AUP(OP)), being a combined regional and district plan for the greater Auckland area.

The majority of airport land is zoned Special Purpose – Airports and Airfields under the AUP(OP), with the land use provisions governing the airport contained within the North Shore Airport precinct (see Figure 2). These provisions provide for most airport activities to take place as a permitted activity.

There are two pieces of land (Lot 86 DP530003 and Lot 9 DP324993) owned by NSAC at the northern end of Runway 03/21 and at the eastern end of Runway 09/27 that are currently zoned Large Lot Residential with specific overriding rules for an aeropark contained within the Dairy Flat precinct provisions.

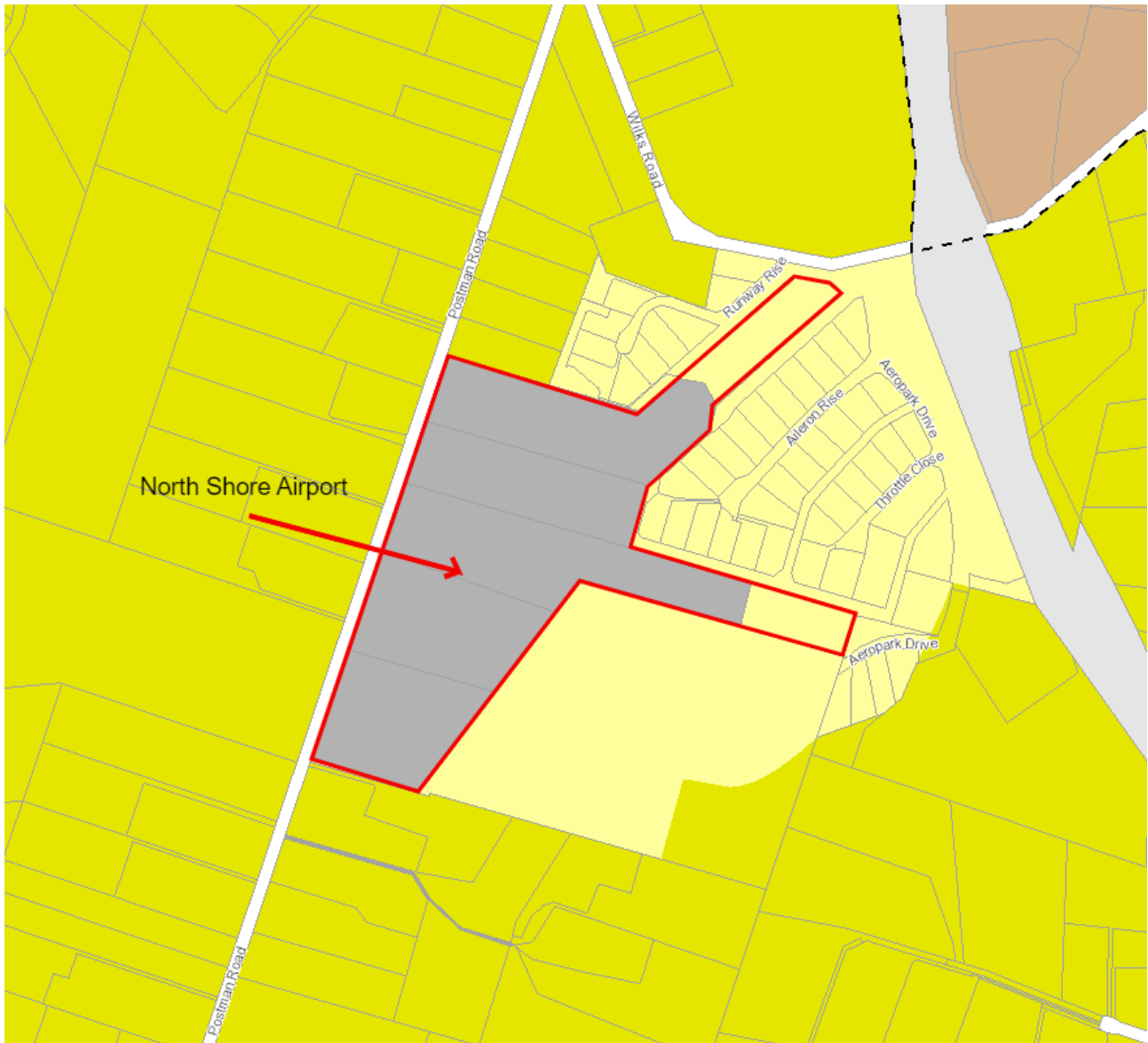


Figure 2: AUP(OP) Zoning Map of North Shore Airport (2019)

There are two types of overlay rules that apply to the airport land and surrounds. The Airport Approach Surface Overlay controls protrusions or obstructions into airport approach surfaces. The Aircraft Noise Overlay manages the subdivision of land and the location of activities in areas of high cumulative noise around the airport. The location of these overlays is shown in Figure 3.

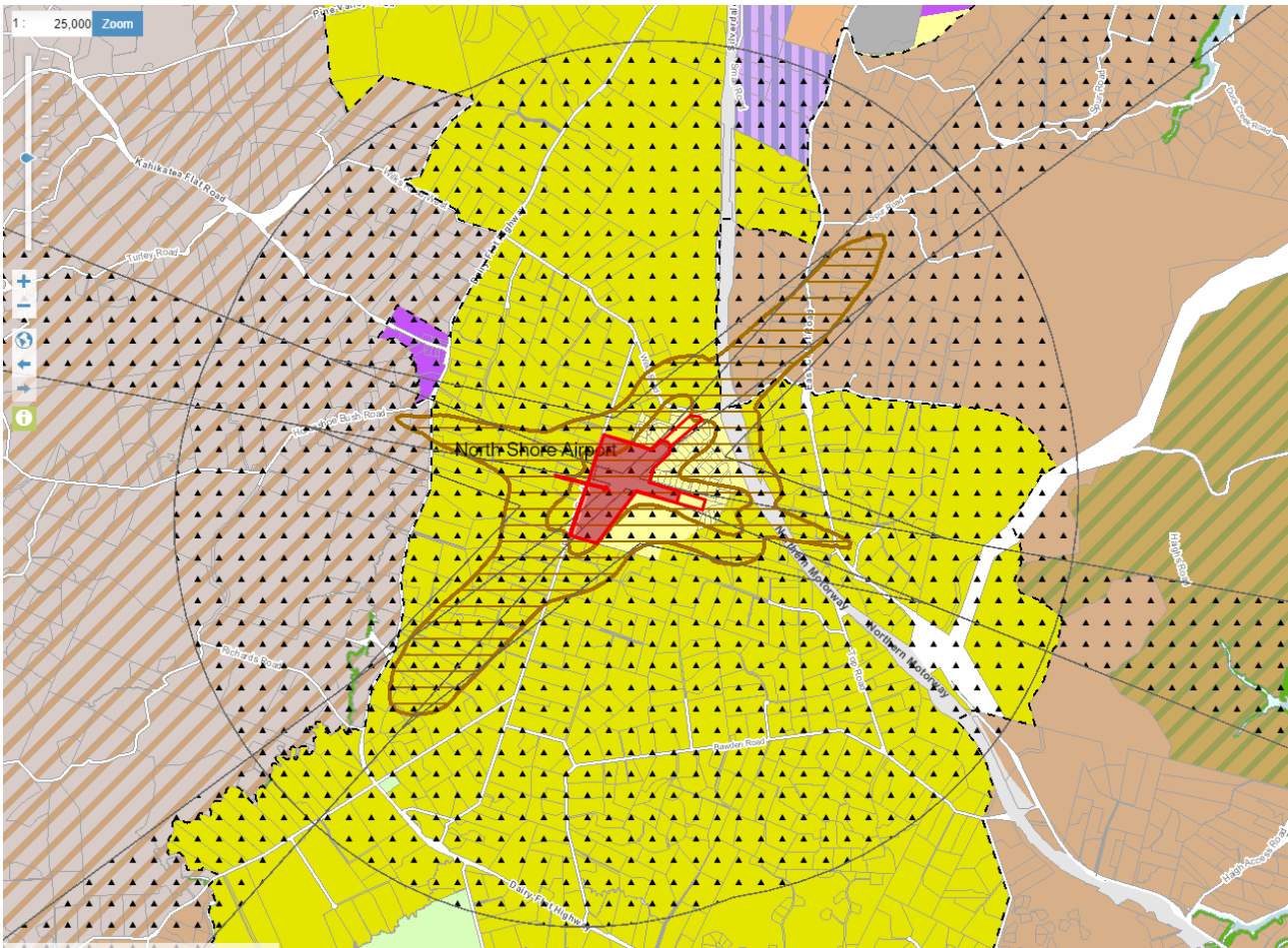


Figure 3: AUP(OP) Overlays (triangles denote the Airport Approach Surface Overlay and brown horizontal lines denotes the Aircraft Noise Overlay)

Surrounding the airport to the north, west and south is land zoned Future Urban (yellow). Some of this land is subject to a structure plan process, with the Draft Structure Plan map for the Silverdale West Dairy Flat Industrial Area shown in Figure 1.

The Council has confirmed the Structure Plan, which will inform a proposed council-led plan change to introduce live zonings proximate to the airport. NSA wants to ensure consideration of airport operational needs and growth are recognised in the final outcome. The granting of Airport Authority status to NSA will further assist it to be suitably acknowledged and its future growth accommodated.

The land immediately to the east makes up the Dairy Flat Precinct, an aeronautical residential subdivision, or 'Aeropark'. Residents within this precinct are permitted to have hangars on their properties for private planes which have access to North Shore Airport via taxiways. The southern portion of the precinct is yet to be developed.

Section 167 of the RMA allows an airport authority to apply to be a requiring authority. Having requiring authority status allows an airport to:

1. Have similar regulatory powers as a local authority or network utility operator with regard to the RMA
2. The airport has a decision making role under the RMA in respect of its own requirements
3. The airport can designate land as required for future projects to protect the operation, maintenance or expansion of the airport

NSA does not currently have requiring authority status.

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## Local Government Legislation and Policy

Besides the AUP(OP), there are a number of Auckland Council and Auckland Transport policies which are relevant to NSA and its operations. Of particular relevance are:

- **The Regional Land Transport Plan** and the **Indicative Strategic Transport Network Plan** – defines the most appropriate transport responses to support Auckland growth. The Indicative Strategic Transport Network plan for the north is administered by the Supporting Growth Alliance, a coalition of Auckland Transport, the NZ Transport Agency and Auckland Council. Future projects for the surrounding area are outlined by the plan at Figure 4. In the future it is expected the growth of the airport will impact on the design of some of these projects.
- **Auckland Plan 2050** – Auckland Plan 2050 was adopted in June 2018, replacing the initial Auckland Plan published in 2012. It sets out the spatial plan for the next 30 years. It details that making the best use of our existing airports is essential, along with improving Auckland’s inter-regional connections. The plan is currently is deficient in its vision for air transport in the North and it will be desirable to ensure North Shore Airport is appropriately referenced in the future.
- **The Future Urban Land Supply Strategy** – this identifies a programme to sequence the future urban land supply. It proposes that live zoning for Future Urban areas around the airport are sequenced as follows:
  - Decade One 1st half 2018–2022 - Silverdale – Dairy Flat (business)
  - Decade Two 2nd half 2033–2037 - Silverdale – Dairy Flat (remainder)

Accordingly, any development of the airport must be mindful of these timeframes for development.

# NORTH INDICATIVE STRATEGIC TRANSPORT NETWORK

**JULY 2019**

Projects described in these maps have been identified by indicative business cases and will require further technical investigation, engagement with communities and landowners and statutory approvals before their final detail, location or land requirement is confirmed. They are also yet to be prioritised for funding for delivery over the next 10-30 years.

## NEW RAPID TRANSIT CORRIDOR



- 1 Rapid Transit corridor extending from Albany to Milldale via new growth area

## NEW OR IMPROVED PUBLIC TRANSPORT CORRIDOR



- 2 Bus shoulder lanes from Albany to Silverdale (interim)
- 3 High frequency bus route connecting Orewa and Silverdale with the Rapid Transit corridor

## NEW WALKING AND CYCLING CORRIDOR



- 4 Strategic walking and cycling corridors

## NEW OR IMPROVED TRANSPORT CORRIDOR



- 5 Additional managed motorway capacity between Albany and Silverdale interchange
- 6 Signalisation of Silverdale Street and Hibiscus Coast Highway intersection (with safety treatment) and improvements to Wainui Road for buses
- 7 New connection between Milldale and Grand Drive
- 8 Upgrade Pine Valley Road, Wainui Road, Dairy Flat Highway and Bawden Road to urban standards including walking and cycling
- 9 Improved Silverdale interchange
- 10 New connection from Dairy Flat Highway to Penlink via Jackson Way
- 11 New connection between Bawden Road and SH1
- 12 New full interchange at Redvale (Penlink)
- 13 New SH1 crossing near Dairy Stream
- 14 New motorway interchange at Wilks Road
- 15 Upgrade East Coast Road from Silverdale to Redvale interchange
- 16 Upgrade southern section of Dairy Flat Highway

## SAFETY IMPROVEMENTS

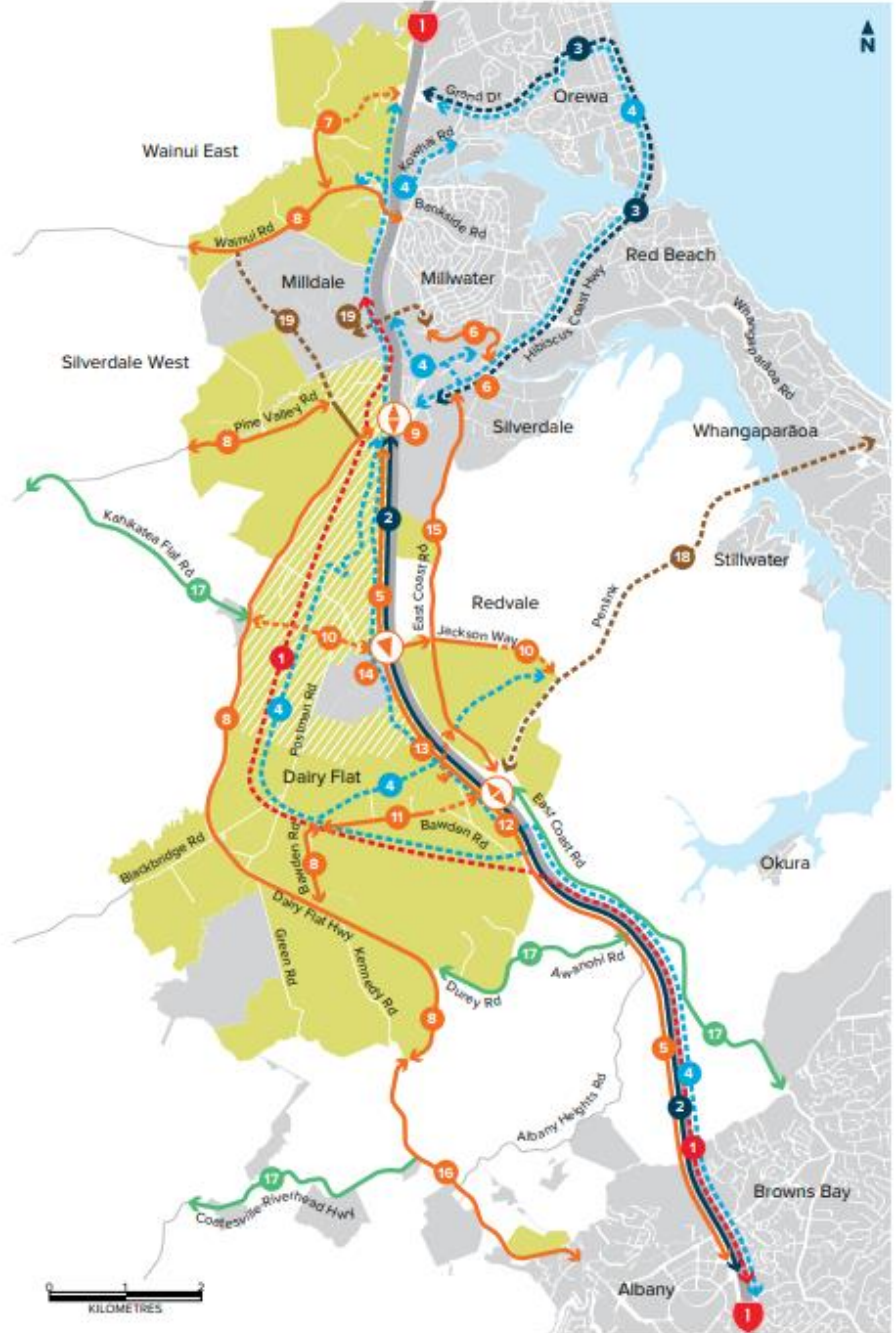


- 17 Safety improvements on Kahikatea Flat Road, Coatesville-Riverhead Highway, East Coast Road and Awanohi Road

## OTHER PRIORITY PROJECTS



- 18 Penlink
- 19 New Argent Lane connection and Milldale to Highgate SH1 crossing



## LEGEND

- New growth area (Future Urban Zone)
- Silverdale West Dairy Flat Industrial Area Structure Plan
- Existing urban area
- State Highway (SH)
- New or upgraded interchange
- New interchange - south facing ramps only
- New rapid transit corridor
- New public transport corridor
- Improved public transport corridor
- New walking and cycling corridor
- New transport corridor
- Improved transport corridor
- Safety improvements
- Other priority projects

Figure 4: Indicative Strategic Transport Network plan



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## 2.7 Key Stakeholders

- NSAC members
- Aviation users of the airport, particularly flying school students
- Tenants on the airport
- Other Industry (particularly airport-related businesses and businesses likely to generate future airport activity)
- Tangata Whenua
- New Zealand Governmental Agencies (Particularly NZCAA, Ministry of Transport)
- Auckland Council and the Rodney Local Board
- Elected Representatives of Government
- Adjoining and nearby landowners and residents
- Community groups
- General public
- Infrastructure providers and utility companies

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## 3 Strategic Vision and Objectives

### 3.1 Strategic Vision

It is proposed that the following mission statement be adopted for the future operation of the airport:

*“To operate a safe and reliable airport facility, based on sound business principles, that services and promotes a range of aviation operations including scheduled air transport services, for the economic and social wellbeing of the north of Auckland.”*

To do this, and for the airport to be recognised beyond Aero Club members, the airport needs to publicise its regional asset status, outlining that it has a unique but irreplaceable location, providing tangible value to Auckland and New Zealand as a whole.

While NSA has always been available to the community with a range of air transport services to smaller destinations, as well as being home to vital emergency medical services (EMS), the functions and strategic importance of the airport will inevitably grow in the future, given the anticipated forecast of increased population in the vicinity.

NSAC confirms the airport is poised to offer a significant regional contribution to the regional transport infrastructure and economy by providing further and more frequent air connections and expanding its footprint to do so. In this context, the following objectives might therefore be defined.

### 3.2 Objectives

The objectives for the airport are:

- Providing facilities of benefit to NSAC members such as runways, taxiways, maintenance facilities and fuelling stations to enable safe aircraft movements
- Creating and providing space for NSAC members to store their aircraft
- Providing flight training services
- To carry out or facilitate the ability of the airport to grow and expand in response to demand, including servicing of the domestic population with regional air transport services
- Promoting the role of the airport and its significance as a regional asset
- Finding avenues for the airport to increase revenue, including through non-aviation development
- To operate the airport in accordance with relevant regulations, including environmental
- Addressing off-airport issues. This will include liaising with the local community and officials to:
  - Protect the existing and future operational needs of the airport
  - To minimise the encroachment of incompatible activities in the vicinity of the airport
  - Ensuring public safety

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## 4 Current Situation

### 4.1 COVID-19

The COVID-19 pandemic has significantly changed the landscape of commercial aviation around the world, with the almost instantaneous drop in demand for air travel

However, while many airports around the country, and the world for that matter, are struggling financially, North Shore Airport is well poised to react positively. This is due to the underlying capitalisation and sustainability that the parent, North Shore Aero Club Inc, affords the airport by way of their diversity in revenue sources.

With the suspension of the vast majority of commercial flights, most airlines are re-evaluating the services they will offer moving forward. With such widespread disruption to the domestic air transport network, an opportunity exists to redefine preferential routes and airport pairs.

Some of the routes previously operated by various airlines will no longer be sustainable or desirable and therefore, not only will the resource potentially be available within the airlines to explore different options, but the appetite to find new, superior sources of revenue will likely drive them towards exploring these options in greater detail.

A big advantage of the COVID-19 induced suspension of flight comes by virtue of the forced disestablishment of various routes. It is unlikely an airline operator would do this on a profitable commercial route under normal circumstances, even if there was merit in transferring the custom to a different route for commercial reasons, as the resulting customer dissatisfaction would be undesirable. However, airlines are now free to redevelop their schedules as they see fit with the risk of customer dissatisfaction having been removed from the equation.

North Shore Airport management are acutely aware that although it will take a number of years for the airline industry to fully recover from this pandemic, the likely recovery timeframe is indeed shorter than the North Shore Airport Master Plan time frames. In order to capitalise upon this opportunity, the North Shore Airport Master Plan must undergo a level of acceleration.

### 4.2 Ownership and Management

The owner of the airport is NSAC, which is governed by an executive committee made up of 10 members who are committed to the airport's vision and goals. Many of the executive members come from successful business backgrounds and are therefore attuned to needs of high-performing organisations, particularly the executive leadership's role in meeting those needs.

The executive provides support to the management team and ensure they have the necessary ability to maintain resources and equipment required to perform the key functions of the airport.

### 4.3 Existing Activities

The Airport has a number of established commercial and private activities on airport land which include the following:

- Private general aviation, including from private sites at the adjacent Aeropark
- Training flights

- Scheduled commercial flights
- Charter flights
- Tertiary education
- Emergency rescue flights and services
- Engineering facilities
- Freight distribution
- Manufacturing
- Support and administration

Some of the above activities are further explained in the sections below. In terms of annual aircraft movements (landings and take-offs), the aircraft operations for NSA are outlined in Table 1.

Category	Aircraft Type	Estimated movements per annum
Fixed wing scheduled	C208	730
Fixed wing charter	C172/ PA23/ PA31/ PC12/ C208 etc.	500
Fixed wing flight training	R2120/ R2160/ A160/ C172/ BE76 etc.	16,000
Helicopter charter	R44/ AS350/ AS355/ EC130/ EC135/ EC145/BO105 etc.	7,250
Helicopter flight training	R22/ R44 etc.	2,500
Private/ GA	Various GA	5,000
EMS & Military	BK117/ AW169/ S76/ B429 etc.	1,800
<b>Total</b>		<b>33,780</b>

Table 1: Estimated aircraft movements per annum

## 4.4 Flying School

The Aero Club, as previously mentioned, operates a significant flight training operation. The flight school movements comprise over 50% of current flight movements, equating to approximately 16,000 movements per annum. The flight school operates 12 aircraft with 14 instructors. There are approximately 200 students engaged undertaking training at any given time, some on a casual basis and some on a fulltime study basis.

Training is offered towards the following qualifications, amongst others:

- Private Pilot Licence
- Commercial Pilot Licence
- Instrument Rating
- Instructor Ratings
- New Zealand Diploma in Aviation
- Training schemes for international students

As a Civil Aviation Authority Part 141 certificated organisation and an NZQA accredited private training establishment, North Shore Aero Club has become a major player in the New Zealand flight training market. The club is widely recognised as producing the very best standard of pilot and consistently ranks as one of the top two or three performers in the country.

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There has been unprecedented growth in recent years with the number of students engaged in training, and the number of movements roughly doubling since 2010. Graduates of the flight school can be found flying for Air New Zealand and other major airlines all over the world.

Operating a modern, well maintained training fleet with a ‘no compromises’ approach to safety has assisted us in developing and maintaining this position. We reinvest heavily in our instructing staff, constantly helping to upskill them and we are very fortunate to have been able to build a solid platform of experienced and knowledgeable senior staff, a quality unparalleled in comparable organisations.

The flight training department is going from strength to strength and currently looking to expand into different markets. Specifically, we are setting up a new brand specifically targeting the overseas markets. Countries such as China and India are facing unprecedented demand for pilots and the situation grows ever more acute each day.

Prior to the impact of COVID-19, the Boeing Pilot Outlook<sup>1</sup> stated that ‘Over the next 20 years, the Asia Pacific region will lead the worldwide growth in demand for pilots, with a requirement for 266,000 new pilots.’ With Boeing and Airbus also predicting that thousands and thousands of new aircraft will be needed in the Asia Pacific region in the immediate future, the demand for crews to operate them is obvious.

As the club’s flight training operation continues to grow, so will the demand it places upon North Shore Airport. Larger, better maintained and equipped runways mean more movements can be handled without compromising safety, with more instructors, engineers, and administration personnel to support the flight training operation. This will bring economic benefits to the local community. In addition, the flight school is also the gateway to new club members.

Given the above, the flying school currently needs additional space to expand its training facilities. This includes new classrooms and educational facilities.

## **4.5 North Shore Aero Club**

North Shore Aero Club Inc provides the overall governance of the airport. As the operator of the airport, it is required to cater for the aeronautical needs of its members.

In catering for the members of the NSAC, it operates the flight training school, provides a range of aircraft available for its members to hire, and facilitates social gatherings, flying trips, rallies, and other aviation events. It also runs public open days where the local community can experience the world of flight. NSA also houses members’ aircraft via:

- Providing land for lease and building hangars
- Providing leasable and rentable space in existing hangars
- Providing outdoor ‘hardstand’ parking

Given the predicted increase in population in the North Auckland area, the membership of NSAC is expected to grow in the future. Accordingly, more space for housing aircraft will be needed. It is forecast that over the next 20 years, approximately 50 new general aviation hangars will be needed.

The growth of the airport in the future may also require a different governance structure whereby an ‘operations’ company is formed to run the airport for the members. This would provide financial stability and meet the legislative requirements of becoming an Airport Authority and Requiring Authority.

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## 4.6 Hangars and General Aviation

Several helicopter companies operate with the NSA as their hub including North Shore Helicopters, Helicopter Me and Orbit Helicopters.

The Royal New Zealand Air Force uses the airport to assist in pilot training and as an alternate to RNZAF Base Auckland (Whenuapai) if required.

There is existing leased General Aviation hangar space on the airport of approximately 20,000 m<sup>2</sup> providing housing for approximately 180 aircraft, of which 2,000 m<sup>2</sup> is owned by NSAC.

## 4.7 Scheduled Services

Scheduled air operations and air charter services (including helicopters) operate to and from North Shore Airport, linking north-Auckland's population with Kerikeri, Whangarei, Great Barrier Island, Whitianga, Auckland CBD, South Auckland, Auckland International Airport, Tauranga and Rotorua.

Regional airlines provide scheduled and charter services to the destinations mentioned above, but also further afield.

North Shore Airport also serves non-resident operators on a commercial basis with flights often landing on charter from other regions. This provides vital and efficient transport links across New Zealand.

## 4.8 Charter and Private Aircraft

The airport currently caters to a range of charter and private services by both private individuals and air operators.

## 4.9 EMS and Rescue Services

The airport is home to one of three of the Northland Rescue Helicopter Trust's (NEST) Sikorsky S76 helicopters providing 24-hour emergency medical services throughout Northland and Auckland. NEST also is the only EMS service in New Zealand with a helicopter capable of flying critical patients requiring life support services the length of the country, and are often called upon to do so with patients such as babies requiring incubation in transit.

Having the helicopter based at North Shore Airport has undoubtedly had a direct impact on saving lives that a base further afield would not facilitate. NEST bases an aircraft at North Shore as it better satisfies its requirements over and above any other airport within the Auckland region.

The Auckland Rescue Helicopter Trust (Westpac Rescue) is also reliant on the airport as a critical piece of infrastructure for their operations, including the ability to refuel, up-load or off-load crew, patients or equipment.

The NZ Police also use the airport often, as it is an ideal location in the north-Auckland area to pick-up, drop-off and refuel.

Military helicopter operations frequently use the airport to satisfy their ongoing training requirements.

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## 4.10 Maintenance Facilities

The Airport has 3 fixed base providers of aircraft maintenance on the site, including Oceania Aviation, NZ's biggest aircraft maintenance provider. They are located in the north-western area of the site. These providers are able to service a wide variety of aircraft ranging from the smallest general aviation aircraft to larger air transport aircraft such as the Cessna 208. There is also an extensive amount of helicopter maintenance and servicing conducted for both resident and non-resident operators.

## 4.11 Fuel

The Airport has both AVGAS and Jet-A1 fuel available provided by Air BP.

The main AVGAS refuelling apron is located centrally on the aerodrome immediately west of runway 03/21 and south of runway 09/27. There is an additional supplementary AVGAS pump located adjacent to the Terminal building.

Jet-A1 fuel is located between the main AVGAS apron and the terminal building and is readily accessible by fixed wing aircraft and helicopters operating from the terminal as well as by helicopters operating from the dedicated helipad adjacent to the Jet-A1 pump.

The Jet-A1 facility is to be significantly re-engineered by Air BP in 2020 with a significant increase in capacity available.

Both AVGAS and Jet-A1 are provided by means of underground tanks.

## 4.12 Existing Terminal Facilities

The existing North Shore Airport terminal building was formerly owned by a third party and is in need of some maintenance. Since purchasing the building in 2015 NSAC has refurbished the check in facilities, departure lounge and toilets, and doubled the customer floor area. The car parking layout was also improved.

For any regional air transport growth requiring more than 70 passenger movements to be handled concurrently, the existing terminal building will not be suitable. Separation of administration areas with passenger handling areas would be required, and increased security systems employed. Baggage handling will be a future requirement when such services are enabled.

The existing terminal building is large enough to be redeveloped, at relatively low cost, to handle 250 concurrent passenger movements which would be adequate for forecast passenger movements up until circa 2028, by which time a new larger facility would be required.

Another constraint of the terminal is its location in relation to the runway. For any runway upgrade, the terminal will need to be outside the obstacle limitation surfaces. At least a 50m setback to the runway strip width will be required and the current location may not achieve this. Moving the terminal further north would provide adequate separation as outlined later in this document.

## 4.13 Access and Parking

Car parking areas are provided for each individual tenant at the airport and it is the tenant's responsibility to meet the required number of parks under the AUP(OP). There is generally ample parking at most leased areas.

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It is estimated that 1 parking space is needed for every 500 passenger movements per annum.

The sealed car park adjacent to the terminal holds approximately 50 parking spaces, with the road reserve accommodating another 30 parking spaces. This number of parking spaces will be grossly insufficient as the airport grows.

If Auckland Transport upgrades Postman Road in the vicinity of the airport to support growth in the area, the 30 road reserve car parks will be lost.

#### **4.14 Utility Services**

NSAC operates a wastewater treatment plant for the whole of the airport. Located on the western side of the aerodrome, it has primary and secondary treatment and has capacity to process 8,000 litres per day, of which only 25% of this capacity is currently being used. This capacity will service future development until the airport is connected to mains sewerage when the surrounding business land is developed.

Stormwater for the site is discharged by ground soakage and via agreed diversions to stormwater ponds on the neighbouring Aeropark site. Future impervious site developments will need to provide retention and detention for stormwater to comply with Auckland Council AUP(OP) rules in such a way that does not increase the risk of birdstrike to the airport.

#### **4.15 Environmental Values**

Air transport is a significant contributor to climate change, where it is estimated that aviation makes up 2% of the total global greenhouse gas emissions. NSA is committed to becoming carbon neutral by 2035. This will involve participating in a carbon reduction and off-setting scheme. Currently, NSAC is engaged in a voluntary carbon offset programme to neutralise the carbon footprint of flying school operations. Details of this program can be found at [www.airportcarbonaccreditation.org](http://www.airportcarbonaccreditation.org).

The size of North Shore Airport is well suited to house electric aircraft when the technology becomes commercial in the near future. These aircraft are likely to be smaller planes, capable of flying short routes, and therefore ideal for regional air transport and for training. They will also emit less noise compared to standard propulsion systems. This will have the potential to substantially lessen one of the main effects on the surrounding area, being noise. Accordingly, over time the size of the airport noise contours will need to be re-evaluated and potentially reduced.



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## 5 Critical Airport Planning Parameters

### 5.1 Opportunities and Constraints

#### Opportunities

With Whenuapai Airport dedicated to defence use, North Shore Airport is the only option for expanded regional services for the north of Auckland, and is not affected by sea level rise. North Shore Airport is located in one of the few areas of flat land in the north of Auckland. This has been determined from an analysis of the topography of the north Auckland area. The airport is also in an enviable location adjacent to the northern motorway (SH1) and the proposed rapid transit corridor. Apart from Whenuapai, there is no other location in the north with these transport links.

There is a need to improve aircraft and public safety with regards to the sealed runway width and the location of the runway next to Postman Road. An opportunity to realign Postman Road concurrently with the development of the surrounding area will improve vehicle safety for the increased users of the road, and also aircraft using the airport.

With small extensions and safety improvements of the main runway, larger regional aircraft could be accommodated, with the airport breaking through the 15-seat barrier into true regional multi engine turboprop aircraft (or electric in the future), such as those operated by the secondary tier airlines in New Zealand.

Becoming a regional airport would have the benefit of providing relief to large facilities such as Auckland International Airport at Mangere. These larger airports are expensive, and inconvenient for smaller airlines that use smaller aircraft. The speed and performance differential between airliners like the Airbus A320 and smaller aircraft such as the Pilatus PC12 make operations of smaller tier airlines into airports like Auckland inefficient. Larger separation distances are required and as such, the carbon footprint and economics of the operations are adversely affected.

In order for the airport to integrate with the indicated future industrial zoning of land immediately surrounding it, commercial activities at the airport need to be developed further. This includes attracting businesses that can make use of the airport facilities, providing necessary jobs for the north Auckland area. In much the same way that Auckland International Airport has achieved it with their surrounding industrial estate, it is envisaged that tight integration with the local industrial estates be coordinated and achieved.

#### Constraints

There is a very high potential for the encroachment of incompatible uses establishing next to the airport and curtailing current operations, unless NSA is active in liaising with Council, adjoining landowners and NZTA to achieve airport continuity and growth. An example of this is the potential upgrade of Postman Road to arterial status in the future, causing significant safety issues for the use of the main runway. The location of this road also complicates any development to the south of the airport.

Future safety improvements and development of the airport will require acquiring neighbouring land which is of high value.

There is a constraint on the amount of land available to accommodate hangars at the airport. There is a small area available to the north-west of the airport, however this will be insufficient to accommodate the needs of the anticipated future growth in general aviation, given the forecast population of the catchment area.

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The club ownership structure makes it difficult to raise capital for large improvement projects. Some change in the structure may be required to mitigate financial risks for the club members, and to facilitate planning processes.

The airport does not have the status of an Airport Authority or a Requiring Authority and therefore does not have the same legislative control that other airports have.

## 5.2 Forecast of Future Operations

Currently almost 500,000 people within Auckland live closer to North Shore Airport than Auckland International Airport. The population projections from Statistics NZ show that within the catchment of North Shore Airport, the overall population will be 734,400 by 2043 as a high figure and 579,600 as a low figure.

The approximate population at 2018 is 465,400, however the latest census showed the population predictions have been exceeded in the past 5 years, with a 50,000 increase in population of the northern electorates from 2013–2018.

Tourism is not indicated as a strong driver for economic growth in the north of Auckland.

In comparison to other major cities, Auckland currently handles 21 million passengers per year. Auckland International Airport are predicting 40 million passengers per annum by 2040 with their second runway operational.

Looking at some other cities around the world:

- Sydney has 1 major Airport with 3 runways collectively handling 42.6 million passengers per annum
- London has 5 major airports with a combined 6 runways collectively handling 153.8 million passengers per annum
- New York has 3 major airports with a combined 9 runways collectively handling 127 million passengers per annum

This represents an average of 38.5 million passengers handled per airport and 17.9 million passengers handled per runway. With 40 million passengers per airport and 20 million passengers per runway by 2040, these figures put Auckland in a more heavily restricted position than any of the cities previously mentioned. The absolute need for a regional airport with the capacity to handle passenger volumes will be reaching crisis by the mid to late 2030s and certainly by 2040.

As a consequence of increasing passenger numbers, smaller commercial airline operators serving the smaller regional airports around the country are being squeezed out of NZAA. This is because smaller aircraft require less turbulent air space for landing and therefore disrupt efficient flight paths that larger aircraft can maintain. Additionally, more passengers per flight are more profitable for NZAA. This will drive these smaller airline operators to NSA.

### NSA Growth Predictions

With an estimated 26,670 movements in 2019, and providing for 3% growth per annum and the addition of further scheduled passenger services, North Shore Airport's aircraft movements are predicted to grow to around 65,000 per annum by 2040.

This figure is partially derived from forecasting commercial services being flown by ATR 72 type aircraft from North Shore Airport to 5 routes, with 3 return flights each day, 365 days per year.

Feasible routes envisaged for such services would be between:

- North Shore and Wellington
- North Shore and Napier
- North Shore and New Plymouth
- North Shore and Palmerston North
- North Shore and Tauranga
- North Shore and Rotorua
- North Shore and Nelson
- North Shore and the Bay of Islands

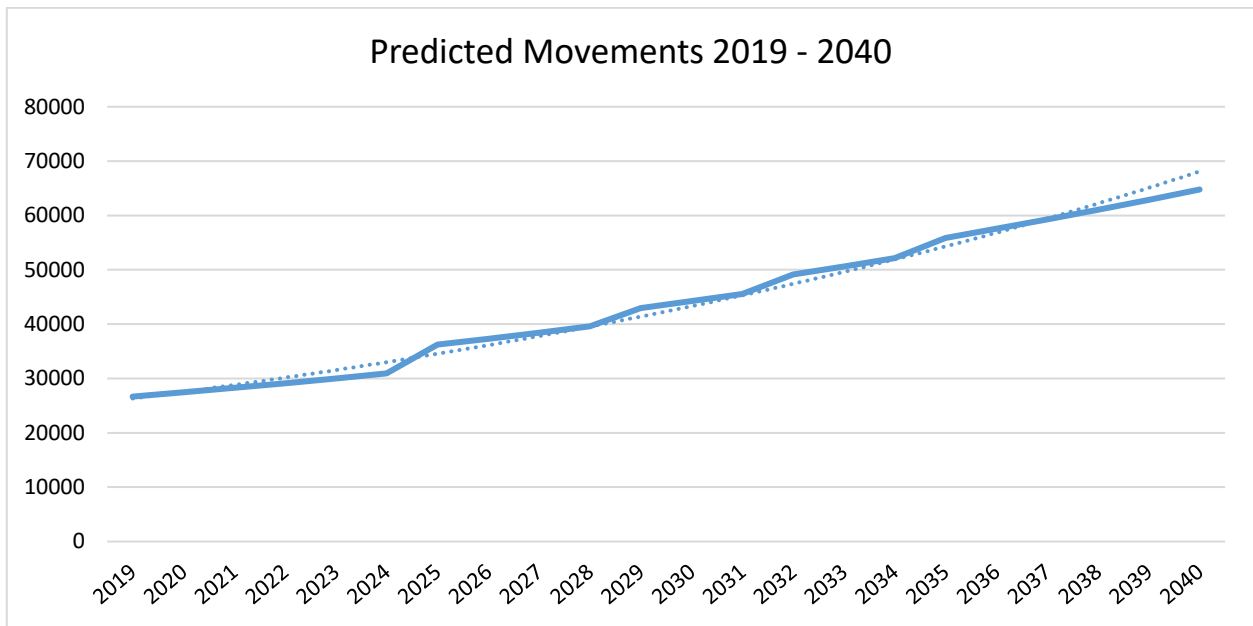


Figure 5: Predicted Flight Movements for NSA

Based on conservative 75% load factors, this equates to a growth in passenger movements to approximately 650,000 by 2040. This only equates to around 1.6% of the capacity of Auckland International Airport by 2040.

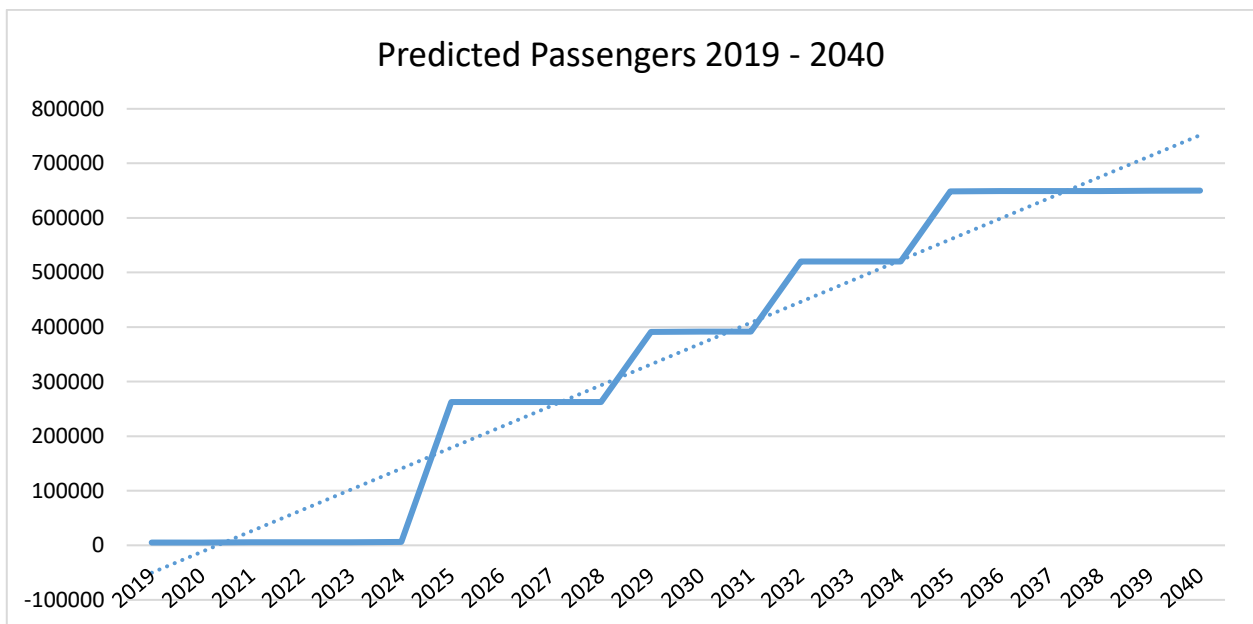


Figure 6: Predicted Passenger Numbers for NSA

### 5.3 Aerodrome Reference Code System

Civil Aviation Authority (CAA) Advisory Circular (AC) 139-6 is applicable to North Shore Aerodrome as it pertains to all aircraft conducting Air Transport Operations (ATOs), and all aircraft above 5,700kg Maximum Certified Take-Off Weight (MCTOW).

AC139 describes the physical characteristics of certificated aerodromes, and aerodromes used for Air Transport Operations. CAR Part 139 Appendix B provides for the Aerodrome Reference Codes shown in Table 2 below.

Currently Runway 03/21 is a code 1B runway. The runway is less than 800m in length, but it can and does facilitate aircraft with a wingspan of more than 15m (but less than 24m).

A Code 2 runway is 800m to 1,200m in length, and a Code 3 runway is 1,200m to 1,800m. A Code C runway can facilitate aircraft with a wingspan of up to 36m. A Bombardier Q300 wingspan is 27m, and a Boeing 737-800 wingspan is just under 36m.

Ultimately, it is proposed that Runway 03/21 at North Shore Aerodrome will become a Code 3C runway.

Code element 1		Code element 2		
Code number	Aeroplane reference field length	Code letter	Wingspan	Outer main gear wheel span
(1)	(2)	(3)	(4)	(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 1200 m	B	15 m up to but not including 24 m	4.5 m up to but not including 6 m
3	1200 m up to but not including 1800 m	C	24 m up to but not including 36 m	6 m up to but not including 9 m
4	1800 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

*Note: The outer main gear wheel span in column 5 is the distance between the outside edges of the main landing gear wheels .*

Table 2: Aerodrome reference code

For a Code 2B runway the runway width must be 23m. For a code 3A/B/C runway the runway width must be 30m. For a code 1, 2, 3 or 4 runway the strip must extend laterally on each side of the runway centre line (for the entire length of the runway) to a distance of 75m, or 150m if the runway is code 4 and has a precision approach. The strip should extend beyond the runway end 10m for a code 1 runway, 30m for code 2, and 60m for code 3 and 4 runways.

No fixed objects are permitted to be placed within the runway strip. No mobile objects are permitted to be within the runway strip while aircraft are taking off or landing.

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## 5.4 Selected Design Aircraft

Companies such as Sounds Air are excelling in providing services using aircraft such as Pilatus PC12 type aircraft on regional routes, and other similar operators are using aircraft such as the Cessna C208 Caravan and the New Zealand made Pacific Aerospace 750.

All of these aircraft have a Take of Distance Required (TODR) and Landing Distance Required (LDR) in the region of 650 to 700 meters at Maximum Weight, which is within the capabilities of North Shore Airport to provide.



Ultimately, the design specification for North Shore Airport has been determined by ATR 72 and Bombardier Q400 type aircraft, which seat approximately 80 passengers. These aircraft have been selected as the design specification for the eventual growth of NSA, as they are the largest of regional turboprop aircraft and are economically feasible operating on the routes envisaged to and from North Shore with conservative passenger numbers.

Accordingly, smaller aircraft such as the Bombardier Q300, Saab 340, Jetstream 31/41 and ATR 42 are within the design parameters.

## 5.5 Aerodrome Approach Control Service

Air Traffic Control Services are not currently provided at NSA. Air traffic control would be necessary for upgrading to a Code 3C runway.

## 5.6 Navigation Systems

North Shore Airport is currently served by a set of single GNSS Non-Precision Instrument Approach Procedures to each runway.

GNSS procedures are becoming more and more prevalent as conventional ground based navigational aids are slowly retired from service. Although limitations exist around the use of GNSS procedures and the necessity of an airport to have a conventional ground-based navigation aid (in order to be used as a final alternate), it is not anticipated that this will be a long term issue. Accordingly, there will be no need for North Shore Airport to install any form of conventional ground-based navigation aids.

Notwithstanding this, the current GNSS procedures may need to be redesigned to accommodate larger, higher performance aircraft and updated runway threshold locations. This is a standard task and NSA has already been through this process several times in recent years.

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## 5.7 Aircraft Movement Area

### Taxiways and Clearways

If the aircraft is taxiing on centre line, the distance between the outer main wheel and the taxiway edge must be at least 2.25m for a Code B runway, 3m for a Code C runway if the maximum aircraft wheel base is less than 18m, or 4.5m if the wheel base is 18m or greater.

If the width of the taxiway is not determined by the wheelbase of the aircraft using it, the taxiway width should be not less than:

- Code A - 7.5m
- Code B - 10.5m
- Code C - 15m

The minimum separation distance between the centre line of a taxiway and the centre line of a runway or the centre line of another taxiway or another object (respectively) should be:

- Code 1B – 87m – 23m – 15.5m
- Code 2B – 87m – 32m – 20m
- Code 3C – 168m – 44m – 26m

These distances are for instrument runways only and apply to Runway 03/21.

Current land constraints mean a taxiway the full length of and parallel to Runway 03/21 is not feasible in the immediate future. However, many significant airports such as Hamilton and Queenstown operate without this luxury.

A small full-length parallel taxiway could be accommodated within the runway strip which could be used by light, general aviation aircraft when ATOs were not in progress. However, this would require a surface movement control solution at the very least.

The existing taxiway infrastructure can continue to suffice with larger volumes of general aviation movements, however upgrades of the airport to higher CAA ratings will require new taxiway infrastructure.

### Aprons

The apron space outside the terminal will be insufficient for an increase in movements signalled by a Code 2B rated airport. One option for providing greater apron space is to utilise space where Runway 09/27 is situated (East of Runway 03/21) if this runway was disestablished. This would permit a new apron space to be created alongside the desired location for a new terminal facility and is outlined later in this document. This space would be adequate for up to 5 ATR 72 sized aircraft.

## 5.8 Pavement Strength

Currently, the runway is constructed to an Equivalent Single Wheel Load (ESWL) strength of 2,500kg meaning the largest aircraft that can use the runway (if they only have a single wheel per undercarriage leg) is 5,555kg. Aircraft with a larger number of wheels per undercarriage leg are permissible at a higher weight than this.

To sustain the projected design loads of the latter phases of development in this plan and permit operation of aircraft such as ATR 72s, the runway would need to be significantly stronger.

The largest aircraft envisaged would be an ATR 72 at a maximum ramp weight of 23,170kg. Data taken from the aircraft manufacturer helps establish the Aircraft Classification Number (ACN) which determines the minimum strength pavement required.

A/C Model	Main Tyre Pressure		Load On One MLG%	Weight kg		Flexible Pavement Subgrade (CBR %)			
	bar	pal				High 15	Medium 10	Low 6	Ultralow 3
ATR72 600	8.4	121.3	48	MRW	23170	12	13	14	16

Table 3: Aircraft Classification Numbers Values

That means it would be constructed to a Pavement Classification Number (PCN) of 15 or 16 assuming a California Bearing Ratio (CBR) indicating a Low or Ultralow strength subgrade.

The aprons and taxiways constructed to service these aircraft would also need to be constructed to the same specification. However, the existing infrastructure will be adequate in all areas other than the Air Transport Operation (ATO) movement areas for these aircraft.

## 5.9 Aviation Support and Landside Facilities

### Aerodrome Weather Information Broadcast

The airport will need to upgrade the current system when a Code 2B Airport is established.

### Maintenance and engineering facilities

The existing aircraft maintenance providers as described at 4.9 will increase their business incrementally as aircraft movements grow. There is sufficient hangar space at their current locations for this to occur.

### Hangars

NSAC’s requirement for hangar space is outlined in section 4.6 and 6.2.9. There is a need for approximately 10,000m<sup>2</sup> for businesses supplying aviation services such as charter companies and helicopter operations etc.

## 5.10 Runway End Safety Area

The CAA requires that a Runway End Safety Area (RESA) must extend at least 90m beyond each end of the runway strip and ideally 240m. The width of the RESA must be at least twice the width of the runway (either side of the runway centre line) or the width of the runway strip.

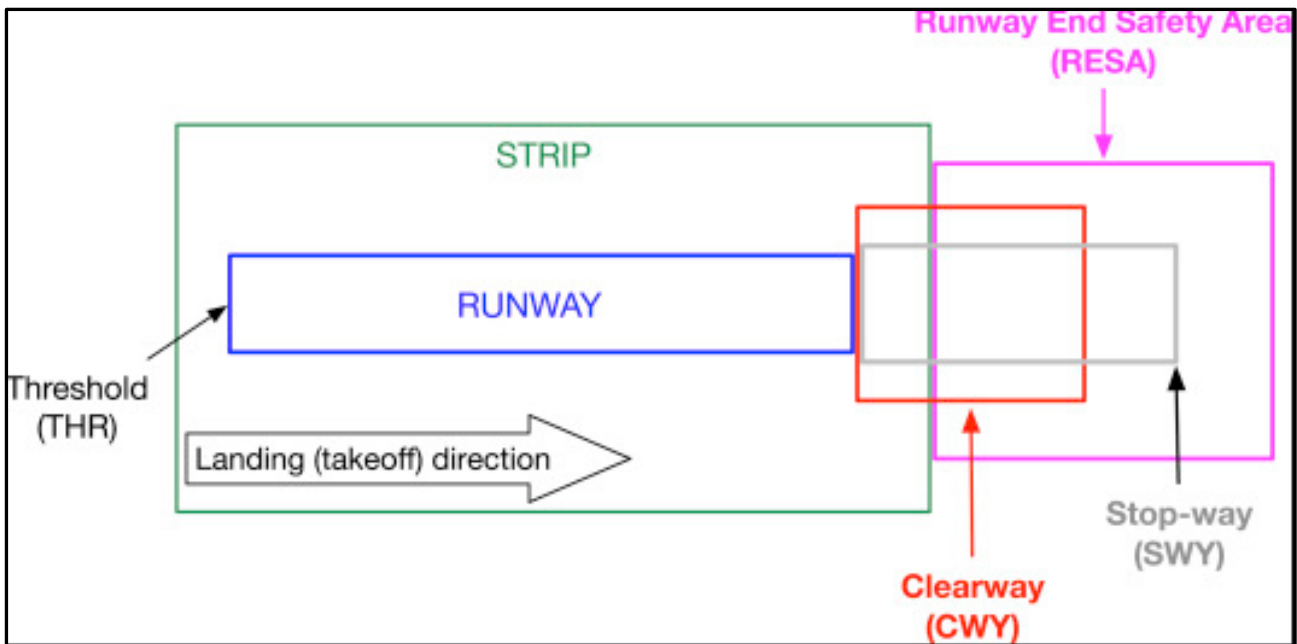


Figure 7: RESA Diagram

At the present time, the RESA at the southern end of Runway 03/21 extends over Postman Road and adjacent farmland. This is due to the historical rural nature of the locality. Given the changing nature of land use in the surrounding area, and the planning for urbanisation taking place, it is imperative a RESA be properly assigned for the airport and such land be safeguarded to reduce the risk of damage to aircraft in the event of an undershoot, overshoot, or excursion from the runway.

### 5.11 Public Safety Area

A Public Safety Area (PSA) is recommended by authorities globally to protect people living and working underneath airport approach and take-off paths. A PSA extends beyond the RESA outwards, and away from the runway. It defines an area within which a person living or working for a period of 1 year has approximately a 1 in 100,000 chance per annum of being fatally injured as a result of an aircraft accident.

The size of the PSA is determined by the size of the airport with consideration given to the number and type of aircraft movements. The current airport does not have a formal PSA, but with the surrounding urbanisation, it is crucial that a PSA be defined. The Australian National Airports Safeguarding Framework can be used to determine the appropriate land uses within the PSA.

### 5.12 Passenger Terminal

As discussed at 4.12 the current passenger terminal will first require upgrading, then relocation to service predicted passenger numbers. Ultimately, approximately a 40,000m<sup>2</sup> floor area will be required by circa 2035 when passenger numbers are predicted to be in the region of 650,000 per annum.

Existing parking at the terminal will be adequate until around 2024 when passenger movements are predicted to surpass the 25,000 per annum mark. Ultimately 1,300 car parking spaces will be required in conjunction with public transport access to the airport.



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Additionally, if no changes are made to the airport car parking capacity in the short term and the road reserve car parks are lost in an upgrade of Postman Road, the timing of additional car parking will not be significantly affected.

NSA is currently in consultation with the Supporting Growth Alliance on the alignment of Postman Road and the future public transport options to the airport as development of the business area occurs. These options are dependent on:

1. An interchange to SH1 being constructed at Wilks Road which will provide adjacent access to the future busway on SH1
2. The rapid transit corridor proposed to the west of the airport (see Figure 4)

These connections will reduce the number of parks required at the airport when future growth scenarios are realised.

### **5.13 Security Requirements**

While there are chain mail and post and rail fences around the perimeter of the airport, for certification of the airport several security requirements must be met such as 1.8 metre high fencing.

### **5.14 Airport Approach Surfaces or Fans**

The runway approach fans rise at a gradient of 1 in 40 and originate 60m beyond the runway threshold (at the edge of the runway strip). The lateral expansion of the fan is 1 in 10 (see Figure 2). The runway transitional side fan originates from the edge of the runway strip and rises outwards at a 1 in 7 gradient.

To accommodate any increased runway width and transitional side fans, no build zones will need to be established within the existing airport footprint, and possibly beyond. Several buildings will also need to be relocated, primarily the main administration and flight training building (Building A1), and the large hangar adjacent to it to the north (Building A2).

These relocations are relatively easy to facilitate as North Shore Aero Club owns the buildings in question and they are used almost exclusively for Club training purposes. NSAC's flight training operation is outgrowing its current facilities and new premises are required.

Similarly, a runway extension to the south will require relocation of the fans and possibly the purchase of any infringing buildings when development occurs.

### **5.15 Aircraft Noise Contours**

The aircraft noise contours for North Shore Airport are shown at Figure 3. The noise contours signal when to apply rules to limit activities that are sensitive to aircraft noise and when buildings must be built with sound insulation.

A change to runway length or width would necessitate a review of the noise contours. This assessment would be undertaken by an acoustician who specialises in airport noise.

Any change required of the noise contours will require an AUP(OP) plan change and therefore the worst-case scenario of fleet mix, and flight data is necessary to achieve the correct modelling of noise contours. It is likely that with electric planes coming into production in 2020, future noise contours for North Shore Airport may be somewhat different than today, as testing shows these planes are significantly quieter.

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## 5.16 Environmental and Heritage Sites

There are no known constraints with respect to heritage at the airport.

Future development plans will need to consider planning for stormwater treatment of impervious surfaces, while avoiding attracting bird life which can cause bird strikes. As the airport is an Industrial Trade Activity under the AUP(OP), an Environmental Management Plan will be formulated as part of future upgrades to cover environmental issues and management of potential stormwater contaminants.

# 6 Airport Master Plan

## 6.1 Land Use Precincts

The airport development area can be divided into six zones, as shown in figure 8 below. The projects referenced within each zone will be prefixed with the zone name.

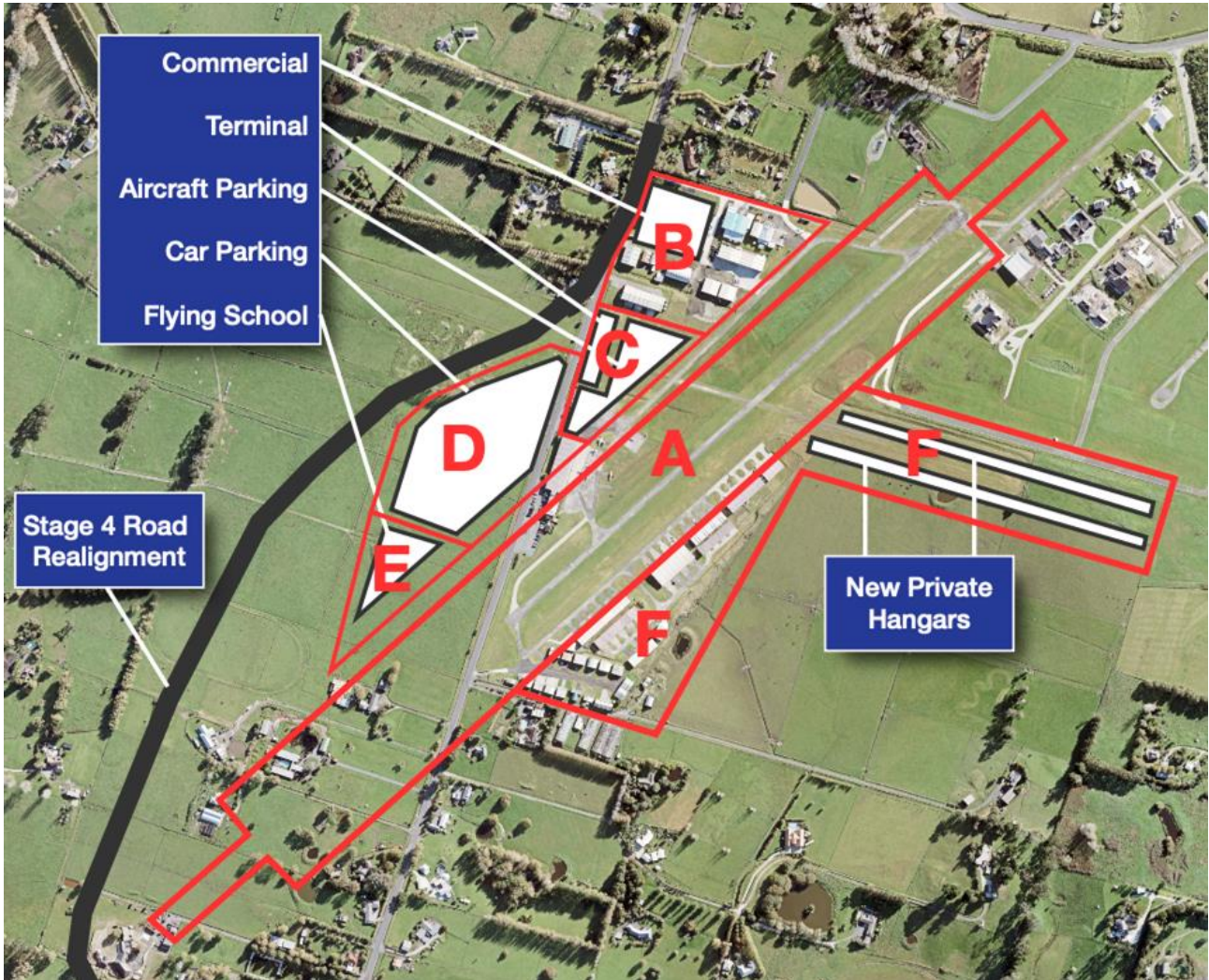


Figure 8: Indicative zone boundaries.

### Zone Alpha (A)

Alpha is the Movement Area in accordance with Civil Aviation Rules Part 1. Zone Alpha includes land currently within the airport boundary, and also land that is not currently within the airport boundary.

### Zone Bravo (B)

Zone Bravo is an airport services and commercial area on land already contained within the airport boundary.

### Zone Charlie (C)

Zone Charlie is the airport terminal and apron area. Both the existing terminal and apron are located within this zone, as are the proposed terminal and apron.

## Zone Delta (D)

Zone Delta is car parking on land that is not currently within the airport boundary.

## Zone Echo (E)

Zone Echo is land earmarked for the Flying School facilities. This land sits outside the airport boundary.

## Zone Foxtrot (F)

Zone Foxtrot is the non-commercial 'private and club member' hangars and facilities and is contained entirely on land which is already within the airport boundaries.

## 6.2 Facilities Development Plan

### 6.2.1 Zone Alpha – Runway 03/21 Development

#### Overview

There are four development stages planned for the main runway at NSA. Stage four sees NSA able to accommodate ATR 72 aircraft and equivalent type aircraft (including Dash 8 Q300 and Saab 340) with passenger seating capacity of up to 80.

As per the New Zealand Aeronautical Information Publication (AIP), the current runway specifications are as follows:

RWY	SFC	Strength	Gp	Slope	ASDA	Take-Off Distance			LDG DIST
						1:20	1:30	1:40	
03	Conc/	ESWL	5	0.3U		738			681
03	Gr*	2500							
21	Conc/	ESWL	5	0.3D		681			738
21	Gr*	2500							

Table 4: Runway 03/21 existing specifications

#### Stage One

Stage One involves a runway extension which will take the overall length of runway 03/21 to 971 meters and accordingly take the airport from having a Code 1B Runway to a Code 2B Runway.

The additional length will be gained to the north-east of the runway in the form of an approximately 180 metre extension using land owned by the airport (Lot 9 DP324993). Due to the topographical limitations, this extension would serve to increase Take-Off Distance Available (TODA) on Runway 21 and Landing Distance Available (LDA) on Runway 03 and Accelerate Stop Distance Available (ASDA) in both directions.

The LDA on Runway 21 and TODA on Runway 03 cannot be increased as the runway threshold at the north-eastern end cannot be easily moved any further to the north-east due to the elevated terrain approximately 1,200 meters to the north-east at East Coast Road.

However, Accelerate Stop Distance Available (ASDA), which is a key requirement for multi engine Air Transport Operations (ATOs), is significantly increased on both runways for take-off. So, although the

Runway 03 TODA will not increase, however the increase in ASDA will permit the safe landing and take-off of larger aircraft such as the 8 to 15 seater Beechcraft King Air multi engine turboprops.



Figure 9: Stage One runway extension

Although the runway could be further extended to the North East using the remaining 100+ metres of clear space available, there is little point in doing so as the benefits are made redundant by the works in Stages Three and Four.

With the lack of increase in TODA on Runway 03, a Runway End Safety Area (RESA) is created by default. This RESA is complemented by the additional 100+ metres of clear space further North East leading up to Wilks Road. Despite the legal minimum of 90 metres for Part 139 certificated airports, in alignment with ICAO recommendations, RESAs are recommended to be a minimum of 240 metres, which is aligned with the distance of the extension and clear way combined in the Stage One development.

The projected runway specifications following the Stage One development are:

RWY	SFC	Strength	Gp	Slope	ASDA	Take-Off Distance			LDG DIST
						1:20	1:30	1:40	
03	Conc/	ESWL	TBC	TBC	971	738			861
03	Gr*	2500							
21	Conc/	ESWL	TBC	TBC	971	861			738
21	Gr*	2500							

Table 5: Runway 03/21 Stage One specifications

The additional length of runway will enable a greater margin of safety to be achieved for all aircraft using the airport, particularly training flights. It will also provide opportunities for third tier commercial airlines to

establish further regional services, servicing the smaller airports of the North Island such as Hamilton, Rotorua and Tauranga etc.

Implementation of Stage One will require an AUP(OP) plan change to change the zoning of Lot 9 to Special Purpose – Airports and Airfields Zone, along with a minor variation to the noise contours. This area can be subsequently designated once the Airport becomes a Requiring Authority.

## Stage Two

Stage Two involves the sealed (concrete) portion of the runway being widened from the existing 9 metres to 15 metres. This width would all be added on the western side of the existing sealed portion of the runway, primarily due to the subsequent constraints of Stages Three and Four.

The increased width achieves 3 primary objectives:

1. Aircraft with a wider wheelbase can use the runway.
2. The increased width potentially permits a redesign of the instrument approach procedures to allow aircraft to fly to a lower Minimum Descent Altitude (MDA) before needing to establish visual reference with the runway. This will result in fewer missed approaches to landing, which in turn means more reliable Air Transport Operations (ATOs), reduced aircraft noise and a lower carbon footprint.
3. The width enhancement will also vastly improve safety for all landing aircraft.

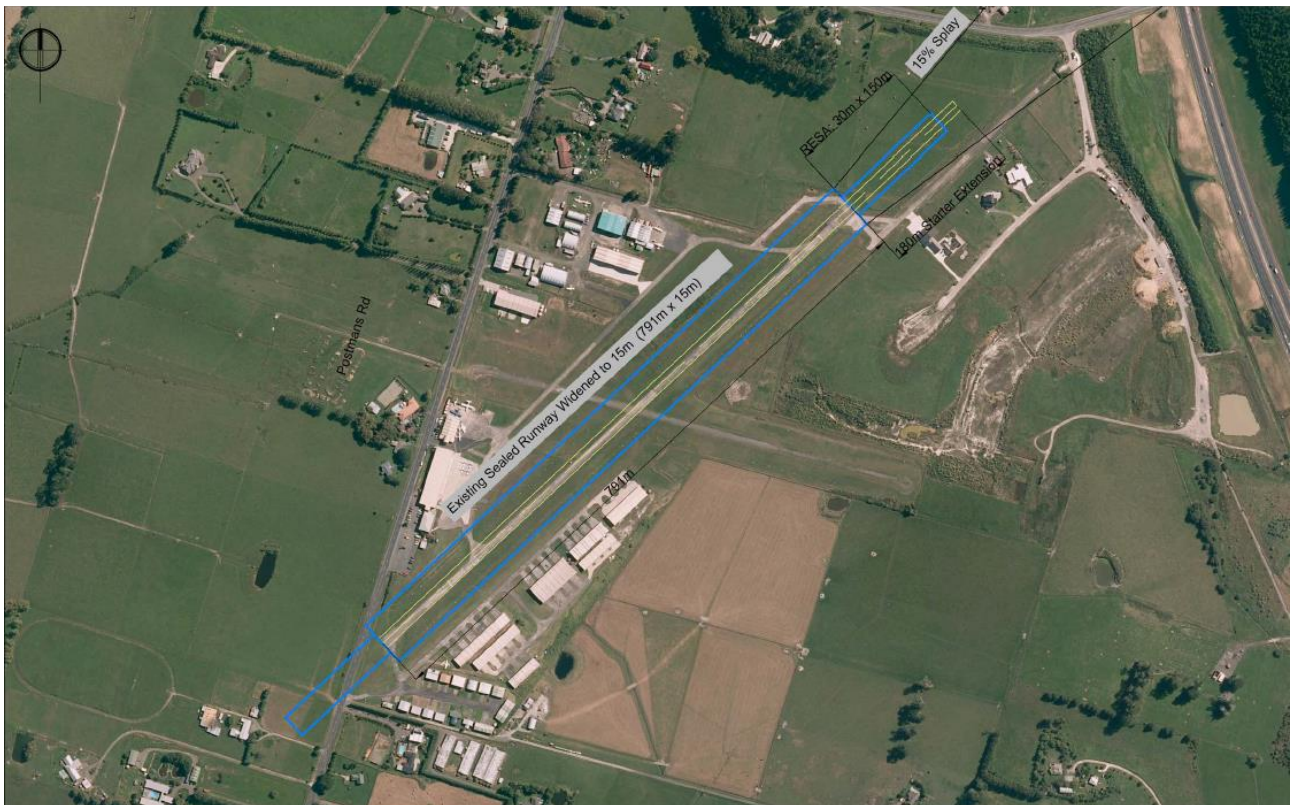


Figure 10: Stage 2 runway extension

The additional width would be added with the final design specification in mind. This means it would be constructed to a Pavement Classification Number (PCN) of 15 assuming California Bearing Ratio (CBR) indicating 'C' strength subgrade. The PCN may have to be a higher if the CBR indicates a lower strength subgrade.

Projected runway specifications following Stage Two development remain the same as Stage One except the additional width permits a greater variety of aircraft to use the runway:

RWY	SFC	Strength	Gp	Slope	ASDA	Take-Off Distance			LDG DIST
						1:20	1:30	1:40	
03	Conc/	ESWL	TBC	TBC	971	738			861
03	Gr*	2500							
21	Conc/	ESWL	TBC	TBC	971	861			738
21	Gr*	2500							

Table 6: Runway 03/21 Stage Two specifications

### Stage Three

Stage Three development involves an extension of the runway to the south-west to a total length of 1120 metres, plus a 180 metre starter extension at each end. It also involves further widening of the sealed (concrete) portion of the runway to 30 metres. The extension would accommodate aircraft such as:

- High Performance General Aviation Aircraft
- Small Business Jets
- Smaller Regional airliners such as the Bombardier Dash 8 Q300



Figure 11: Stage 3 runway extension

This development is a bigger project than Stages One and Two in many respects, particularly as it requires the acquisition of land over and above that which NSA currently owns.

To allow the development of Stage Three and subsequently Stage Four, the proposed relocation of Postman Road would need to occur. This is identified as an option in the background documents for the Silverdale West Dairy Flat structure plan. This is due to the proximity of the road to the runway, which for any significant increase in traffic, will cause driver safety and aeronautical safety issues.

Previous submissions by NSAC to Auckland Council and other agencies (New Zealand Transport Agency, and Auckland Transport) have centred on the need to realign Postman Road to provide for the runway extension, and the RESA and PSA required.

The realignment to Postman Road for Stage Three is shown in the Airport Spatial Plan (figure 12). This realignment has also been acknowledged in the Structure Plan which shows a relocated Postman Road to accommodate growth of the airport. As shown in Figure 13, the possible expansion of the road network in the Structure Plan is more generous than the NSA Spatial Plan, but NSA prefers the more generous approach as this will be necessary for Stage Four. Further consultation is needed with respect to other local roads shown in Figure 13.



Figure 12: The North Shore Airport Spatial Plan



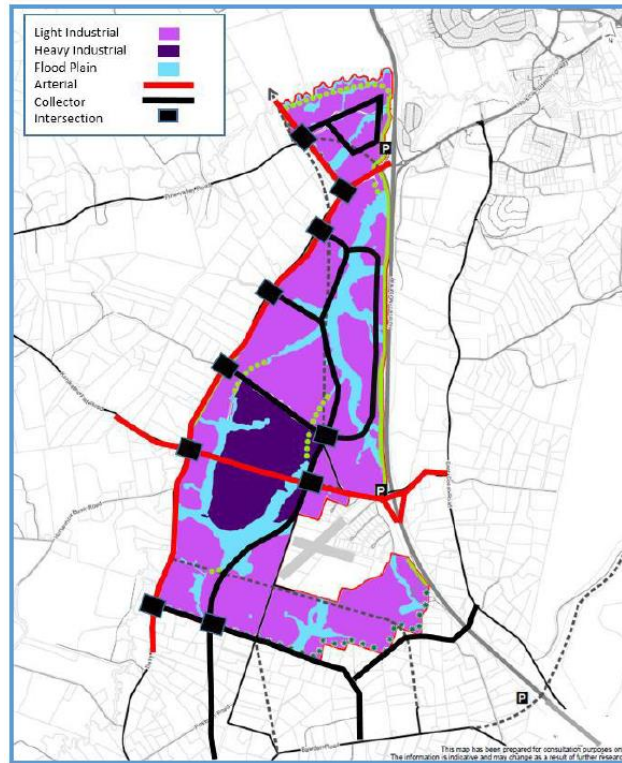


Figure 13: Possible expansion of the road network as per the Structure Plan

The increase in the width of the runway strip to 150 metres overall will make it compliant with CAA CARs Part 139 for a Non-Precision Instrument Approach Runway. In order to accommodate the Transitional Side Surfaces (or Side Fans), the Runway centreline will have to move to the west.

This will be achieved by adding all the width onto the sealed portion of the runway on the western side, in turn pushing the centreline of the strip west.

Because of this, the western limit of the runway and corresponding Transitional Side Surfaces will need to move approximately 50–60 metres further west. This requires further investigation as to the property implications on site as some existing buildings will need to be demolished. As mentioned, Postman Road at the southern end of the main runway will need to be relocated.

The Stage Three runway extension would provide for future aircraft operations up to Bombardier Dash 8 Q300 sized aircraft equivalent specification. It would also provide for a further increase in private aircraft use, enabled by the greater range of aircraft that can be housed at the airport. Additionally, all operations would benefit from the increased safety measures afforded by the larger runway.

Projected runway specifications following Stage Three development:

RWY	SFC	Strength	Gp	Slope	ASDA	Take-Off Distance			LDG DIST
						1:20	1:30	1:40	
03	Conc/ Gr*	PCN	8	TBC	1300	1300			1120
03		15							
21	Conc/ Gr*	PCN	8	TBC	1300	1300			1120
21		15							

Table 7: Runway 03/21 Stage Three specifications

## Stage Four

Stage Four development is based around a further extension of the runway to the south-west by 200 metres, and is the final stage of development required to accommodate the design specification aircraft.

The extension is proposed to be to the following specifications:

- Code 3C runway
- 1,500 metres Take-Off Distance Available in both directions
- 1,320 metres Landing Distance available in both directions
- 150 metres RESA to the North East, extendable to 240 meters
- 150 metres RESA to the South West
- 150 metres runway strip width
- 30 metres wide sealed runway
- Provisioning for a Public Safety Area

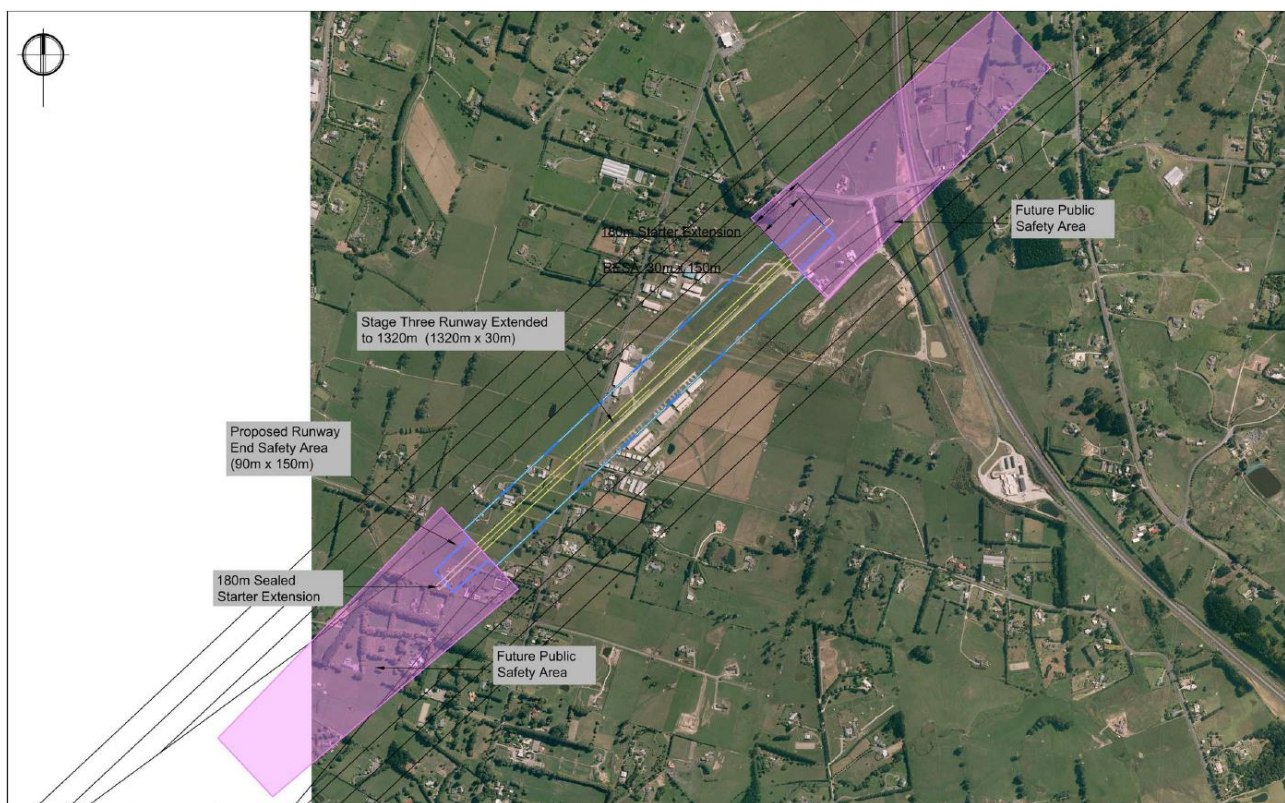


Figure 14: Stage Four runway extension

Overall, the effective extension from the current runway specifications is:

- 762 metres for Take-Off on Runway 03
- 689 metres for Landing on Runway 03
- 869 metres for Take-Off Runway 21
- 762 metres for Landing Runway 21
- 709 metres for ASDA in both directions

The implementation of this runway expansion will require a business case analysis to be undertaken. However, considering the future necessity of the air transport needs of the surrounding population, the extra land required should be set aside for this purpose.

Encouraging Auckland Council to zone the land appropriately in the Structure Plan process will be necessary. The land can be designated once NSA obtains Airport Authority status and Requiring Authority status, which will protect the runway extension area.

Stage Four will have further implications on the alignment of Postman Road. The northern part of the road, as discussed in Stage Three, remains satisfactory. This extends to approximately opposite the proposed threshold of Runway 03 in the Stage Four concept plan. From there, the road would need to extend further South before veering west or south-west to re-join the existing Postman Road alignment. The potential realignment as proposed by the Supporting Growth Alliance appears to suffice for Stage Four realignment.

The Stage Four development of the main runway means larger regional aircraft could be accommodated up to ATR 72 and Dash 8 Q400 standard. It is considered that this stage of development would be ideal to provide a regional mass transport hub for the north of Auckland.

The projected runway specifications following the Stage Four development:

RWY	SFC	Strength	Gp	Slope	ASDA	Take-Off Distance			LDG DIST
						1:20	1:30	1:40	
03	Conc/	PCN	8	TBC	1500	1500			1320
03	Gr*	15							
21	Conc/	PCN	8	TBC	1500	1500			1320
21	Gr*	15							

Table 7: Runway 03/21 Stage Four specifications

## 6.2.2 Zone Alpha – Runway 09/27 Disestablishment

Runway 09/27 is a lightly used secondary runway with a gravel and grass surface. Its primary use currently is to facilitate the arrival and departure of helicopter traffic without interfering with operations on Runway 03/21, however this is a luxury that has little necessity.

Disestablishing Runway 09/27 would provide several benefits:

1. Strategic land is released for repurposing (discussed in section 6.2.9 Zone Foxtrot and 6.2.5 Zone Charlie)
2. The noise overlays can be amended to reshape the 55db and 65db boundaries reducing their impact on neighbouring titles
3. Air traffic patterns around the airport will be simplified
4. Improved safety for aircraft transitioning from the Whenuapai Control Zone into North Shore Airspace by having longer transition times allowing more radiotelephony communication and awareness before joining the circuit
5. Removal of traffic that potentially conflicts with the Runway 03/21 low level circuit

## 6.2.3 Zone Alpha – CAA Exemptions

NSA can apply to the CAA to reduce the recommended physical characteristics of the airport to achieve the aims of certain development stages. In order to gain an exemption to a particular criterion, an aeronautical study would need to be carried out, and design requirements and procedures put in place that would mitigate any adverse risk. The CAA tends to take a risk-based approach in dealing with such matters.

An initial exemption application may be to allow a slight reduction in the strip width so existing buildings can remain as they are currently positioned in the shorter term under Stage 3. The south-eastern taxiway (and taxiway 5) may still present a problem, depending on the extent of the exemption. Ultimately (at Stage 4), this problem should be resolved with the use of Aerodrome Surface Movement Control to prevent aircraft penetrating the runway fan while other aircraft are taking off or landing.

## 6.2.4 Zone Bravo

The short-term objective is to develop the business land to the north of the site to assist funding of the initial investment opportunities and early stages of the airport expansion and works.

As shown in figure 15, Zone Bravo is heavily fragmented and suffering the consequences of haphazard development over the years, with no strategic plan underpinning the selection of sites for the construction of buildings.



*Figure 15: Zone Bravo, North Shore Airport*

To maximise the potential of this area a comprehensive redevelopment needs to take place. Zone Bravo is intended to become a precinct biased towards aviation related activity. Aircraft movements will be protected and controlled by airside / landside gates and fences.

### **Project Bravo One**

The north-west corner of the airport contains a square of land approximately one hectare in size with around 90 metres of road frontage (see Figure 16). The eastern side of the site has 4 buildings currently situated on it which would need to be demolished to permit the Project Bravo One redevelopment. The development would be designed as a number of business / warehouse units.

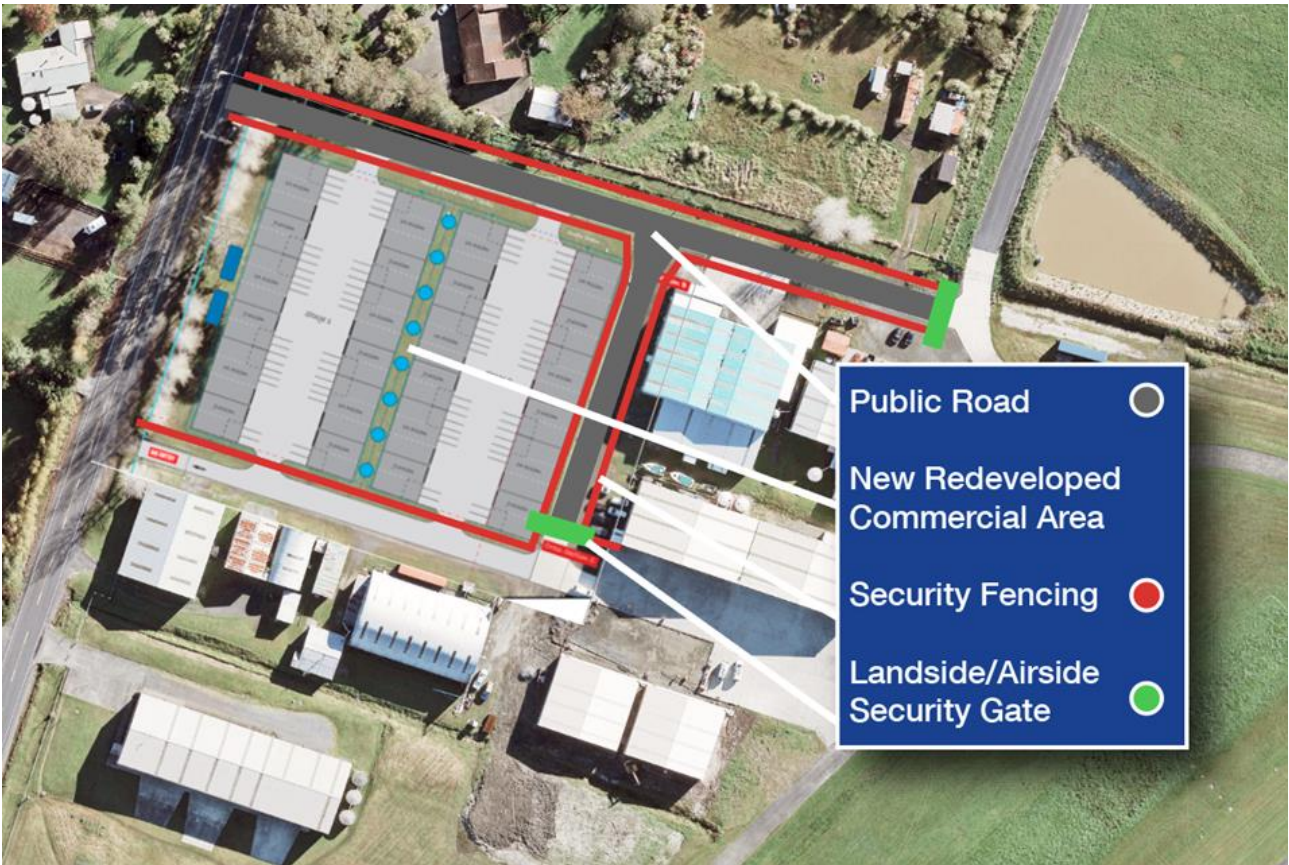


Figure 16: Project Bravo One area

Road 9 and Road 8 to the north and east will become public access roads with a Landside / Airside Access control point at the airport end of each road respectively (refer to the grey roads in Figure 16). New perimeter fencing will be required.

Wastewater can be accommodated by the existing North Shore Airport wastewater infrastructure. There is likely to be sufficient irrigation land available to permit an increase in capacity of the existing system or installation of a parallel system. Eventually the area can be integrated with the infrastructure that the surrounding urban development will bring. Potable water would initially be tank based.



Figure 17: The style of development planned for Project Bravo One

### 6.2.5 Zone Charlie – Terminal

A new terminal building will be required with a floor area of approximately 2,500 square metres to service the 1,755+ passenger movements ultimately expected per day.



Figure 18: Possible terminal design concept

This can be located within Zone Charlie as shown in Figure 19, with the disestablishment of Runway 09/27.



*Figure 19: Indicative layout for re-use of the western end of Runway 09/27*

Preceding this development will be the following projects:

1. Project Charlie One – upgrade of the existing terminal facility
2. Project Charlie Two – the new terminal facility
3. Project Charlie Three – upgrade of the main apron

### 6.2.6 Zone Charlie – Apron

To service both the existing terminal and the proposed new terminal, the main aircraft parking apron will need to be extended. The extension will originate from the Southern end to better serve the existing terminal facility before extending north to serve the proposed new terminal facility.

The apron will ultimately be large enough to comfortably accommodate 5 ATR 72 sized aircraft. This new apron will be approximately 11,000 square metres and also provide adequate space and facility for baggage and passenger handling.

### 6.2.7 Zone Delta

Projects Delta One and Delta Two will see the existing car park upgraded, followed by construction of a new car park. Specifics of these projects will be deferred to the implementation plan.

## 6.2.8 Zone Echo

### Project Echo One

Project Echo One involves the provision of space and construction of facilities for the Flying School. As a co-subsidiary of the NSAC parent organisation along with North Shore Airport, the flying school has its own Master Plan and it will be left to the flying school to specify the design and criteria of the new facilities. However, the design must comply with all North Shore Airport criteria, plus government regulations and by-laws.

Notwithstanding this, it is envisaged the new facilities would include a new combined hangar and educational facility with general aviation apron space and independent car parking.

## 6.2.9 Zone Foxtrot – General Aviation Hangar Facilities

NSAC's primary objective is to accommodate General Aviation (GA) aircraft at the airport, and providing hangar space is of paramount importance. The disestablishment of runway 09/27 provides significant opportunity for this by enabling:

- Construction of more than 12,000 square metres of hangar space and a further 9,000 square metres of apron east of Runway 03/21
- Utilising 12,500 square metres of land with 110 metres of road frontage to the west of Taxiway B for the new airport terminal and apron

A constraint of this proposal is vehicle access to the eastern hangars. The land to the east of Runway 03/21 is surrounded on three sides by privately owned property, being part of the Aeropark to the north and east, and with a private land owner to the South (but also zoned for Aeropark).

At present there is limited public access options as the Aeropark is a private estate. Furthermore, the adjoining property to the South is also relatively landlocked. Negotiations with the landowners and possible upcoming rezoning options may allow improved road access from the south-east.



Figure 20: Indicative layout for re-use of eastern end of Runway 09/27



The redevelopment of the eastern part of Runway 09/27 would allow upwards of 60 hangars at 14m x 14m and extend into Lot 86. Design of these hangars may need to accommodate access for Aeropark hangars approved under the 43 lot subdivision for the southern portion of the site, and also adhere to the building setbacks for the Airport Zone.

### **Project Foxtrot One**

This project involves a new taxiway along a disestablished Runway 09/27 and construction of approximately 70 new hangars. The hangar space most sought after is 14m by 14m for general aviation and private member use.



*Figure 21: The style of development planned for Project Foxtrot One*

### **Project Foxtrot Two**

The development of Runway 03/21 means the existing Aero Club buildings will need to be demolished. It is envisaged that new 'clubrooms' would be established in Zone Foxtrot to bring all the general aviation (excluding flying school) facilities into the same zone.

## **6.3 Business Park**

As identified earlier in this document, NSA plans to create synergies and develop links with the surrounding business / light industrial area created by the AUP(OP). Part of this will require active business development with aligned businesses and also discussions with Auckland Council as to a possible precinct approach for surrounding business land.

Establishment of land use precincts surrounding the airport, particularly to the north and west would also enhance the ability for NSA to grow its footprint and attain ownership of the immediately adjoining land. By

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being a more significant title owner in the immediate area, many reverse sensitivity issues facing the airport are mitigated.

The establishment of a sound investment portfolio in developing adjoining land will help underwrite the costs of airport development and should be seen as a primary means of financing the airport development.

## **6.5 Environmental Management Plan**

Given the recent and proposed growth of the Airport, a formal Environmental Management Plan is being developed to address environmental legal obligations. Matters to be included are air emissions, waste management, hazardous substances, stormwater management, wastewater management, noise and wildlife control.

Wastewater management is potentially the biggest perceived obstacle to major development on-site in a ten-year timeframe (beyond Project Alpha). However, NSA has an onsite wastewater system with capacity for processing 8,000 litres per day, of which only 25% of this capacity is currently being used. Furthermore, subject to investigation, there is likely to be sufficient land available to permit an increase in capacity of the existing system or installation of a parallel system.

## **6.6 Iwi and Heritage Management Plan**

Establishing meaningful engagement with the local iwi will aid the airport in meeting its statutory obligations and also to recognise any design issues that have a unique Maori perspective. The engagement process will begin with consultation on the Master Plan and follow established protocols for engagement.

## **6.7 Airport Safeguarding Plan**

### **6.7.1 Airport Safeguarding Framework**

The land surrounding the airport is planned for comprehensive urbanisation. It is imperative the airport operate a Safeguarding Framework to allow complementary planning of the area with the airport. Without it, tensions between airport operations and industrial and residential development will increase and cause curtailment of airport operations. Accordingly, there is a need to ensure the coordination of on-airport and off-airport planning. Regardless of who owns and operates an airport, planning on or in the vicinity of an airport needs to be conducted in a manner that is cognisant of all parties.

Coordination for planning around the airport will require dialogue with Auckland Council to ensure appropriate planning controls are in place for future zoning plan changes, and for the investment in the surrounding transport network.

Such planning controls would include precinct rules for the proposed industrial area to identify complementary uses to airport operations and suitable standards to:

- Reduce the risk of distractions to pilots
- Reduce the risk of wildlife strikes
- Reduce the risk of buildings generating wind shear and turbulence
- Assess the risk of intrusions into air space
- Manage the public safety area at the ends of the runway

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## 6.7.2 Airport Approach Surfaces

For each stage of development, as outlined at Section 5.14, the approach surfaces will have to be re-assessed. If change is required, a Plan Change will be necessary or the surfaces altered through the preferred designation process.

## 6.7.3 Aircraft Noise Contours

The airport recognises the importance of its role in the local community. It operates a good neighbour policy and provides liaison between airport users and residents to address noise complaint issues. It is important to note that the airport has no control over the noise of aircraft in flight but investigates and manages all complaints received.

## 6.7.4 Planning Policies and Controls

The benefits of North Shore Airport becoming an Airport Authority and a Requiring Authority were touched on earlier in this document. A short term objective under this plan is to make an application to the Ministry of Transport requesting North Shore Airport be recognized as an Airport Authority.

### **Airport Authority Status**

Airport Authority status to us, is an overlay mechanism that will allow a nimbler level of adaption to the regulatory and bureaucratic matters pertinent to airport operations. The resultant improvement in our ability to adapt will be seen in a wide array of areas including airport safety, security, obligations under the Ministry of Transport, Safety Management Systems (SMS) regulations under the Civil Aviation Act 1990 and the Health and Safety at Work Act 2015.

In short, the conferment of Airport Authority status is another helpful tool in the management toolbox, and like all tools it needs to be used for the right tasks and exercised sensibly with wisdom and due consideration.

The request for, and the granting of Airport Authority status by the Minister of Transport, is clearly appropriate given that Airport Authority status is a clearly focused facilitation tool fit for purpose and intended to be applied to airports. It will undoubtedly assist North Shore Airport management in remaining focused and disciplined, and able to make sound, robust and credible decisions.

North Shore Airport has traditionally grown within a conservative organic based model that keeps pace with the changing operational environment. Although this historical operational platform has served North Shore Airport well, to be able to forward plan effectively in the increasingly fast paced communication environment the world has become, a more focused and timely information stream is required, along with implementation certainty once decisions have been made.

### **Requiring Authority Status**

With the granting of Airport Authority Status (as defined by the Airport Authorities act 1966), NSA falls under the “network utility operator” definition. It will therefore be able to apply under the Resource Management Act 1991 (RMA) to the Minister of Environment to become a Requiring Authority.

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By doing so, NSA will be able to operate under part 8 of the RMA, with necessary powers to protect the further growth and development of NSA and the opportunity for Auckland to have a second commercial airport.

Requiring Authority status will be another valuable tool in the toolbox for management to leverage should it be needed. The primary benefits afforded to North Shore Airport would be:

- The ability to issue a Notice or Requirement to designate land for airport purposes
- The ability to undertake development of the airport using the Outline Plan of Works provisions of the Act
- The ability to prevent the use and development of designated land which would prevent or hinder NSA from undertaking a project or work to which the designation relates

However, use of these benefits would be an absolute last resort and all practical alternatives would be pursued.

### 6.7.5 Further Information

For any further queries please contact John Punshon, General Manager North Shore Aero Club.

**John Punshon**

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