Nelson Airport runway extension

Economic benefits of airport and assessment of runway extension options
Final Report

MARTIN JENKINS

27 February 2023

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Preface

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Introduction

Context and purpose of report

Nelson Airport is a regional airport located at the top of the South Island, south-west of the Nelson city centre. It is equally close to the Nelson city centre (8 kilometres) and Richmond (9 kilometres), the main population centres in the Nelson Tasman region.

Nelson Airport Limited is jointly owned by Tasman District Council and Nelson City Council as a Council Controlled Trading Organisation (CCTO).

Nelson Airport is one of the busiest regional airports in the country, and the sixth busiest airport in New Zealand.

Through Air New Zealand, Nelson Airport has direct links with the cities of Auckland, Wellington, and Christchurch. Other carriers including OriginAir, Sounds Air, and Golden Bay Air provide direct provincial links to the North Island cities of Paraparaumu, New Plymouth, and Palmerston North, as well as short hops to "local" destinations, Takaka and Karamea, in the north of the South Island.[1]

The Airport's current runway is one of the shortest in the world for Code C aircraft. The Airport has been planning to extend the runway for several years to improve operational safety, resilience, and to accommodate any future aircraft which may require longer runways.[2]

The Airport has determined it will need to extend the runway in approximately 10-15 years. To enable the runway extension, Nelson Airport is in the process of seeking alterations to its existing designations and the associated planning controls. This report looks at the economic benefits of the Airport to the region and considers whether, from an economic perspective, the Airport should extend the runway north through the Nelson Golf Club, or south over Jenkins Creek and Waimea Estuary.

Report structure

This report is in two parts.

Part 1 outlines the economic value that Nelson Airport provides to the Nelson Tasman region.

Part 2 assesses the options of extending the runway north or south to find which option is more economically efficient.

Two appendices provide a summary of the key assumptions used in the analysis, and an assessment of the options using a multi-criteria analysis.

[1] MartinJenkins: Nelson Airport's contribution to the Nelson Tasman economy, June 2019.

[2] Nelson Airport Master Plan 2050, https://static1.squarespace.com/static/57df12e4e3df28c822c8345d/t/62cb976b6a3d6b58b3d53746/1657509748272/Nelson+Airport+2050+Master+Plan+%2813298r02m%29.pdf

Part 1: Economic value of Nelson Airport to the region

Our analysis is based on findings from our earlier 2019 report

In 2019, MartinJenkins completed a report evaluating the economic benefits that Nelson Airport provides to the local economy, with a focus on the redevelopment of its passenger terminals.[3]

Using this report alongside information we gathered in this project, we will explain the areas of economic value that Nelson Airport brings to the Nelson Tasman region.

Impact of COVID and returning growth

In the time since this information was gathered and evaluated, the Airport was impacted by the COVID-19 pandemic.

Prior to the pandemic, passenger numbers peaked in 2019 at nearly 1.1 million, off the back of steady growth.

From 2020 to 2022, during the COVID-19 pandemic, tourism was minimised due to domestic travel restrictions. Capacity within New Zealand's domestic network dropped to as low as 95% of pre-Covid schedules. The total number of passengers through Nelson Airport decreased to about 600,000 in the 2021/22 financial year.

However, since mid-2022, passenger numbers have been rising and the Airport expects annual passenger numbers to steadily return to pre-Covid-19 levels of more than one million passengers per annum. Customer satisfaction surveys show that passengers are more confident in the future for travel, with 80% of survey respondents wanting to travel within the next 6 months.[4] Due to the steady growth of passenger numbers before the pandemic and observation of how quickly passenger activity has responded to the removal of COVID travel restrictions, the Airport expects continuing growth over the next decade. Accordingly, the economic assessment from the 2019 report remains relevant and forms the foundation of this report.

Nelson Airport is a significant economic contributor to the Nelson Tasman region

Summary

The economic contribution of Nelson Airport can be considered in three groups:

- **Airport and precinct** – operational and capital expenditure by the Airport, airport-associated companies providing airport operations, and companies using the airport facilities.
- **Tourism and trade** – expenditure from visitors in the Nelson Tasman region enabled by the Airport.

[3] MartinJenkins: Nelson Airport's contribution to the Nelson Tasman economy, June 2019.

[4] Annual Report FY2022, Nelson Airport.

- **Catalytic** – business and population growth and productivity enabled by the Airport.

In aggregate, the Airport is a significant contributor to the Nelson Tasman region, and top of the South Island, in a variety of ways, on top of providing consistent and growing dividends to both Nelson and Tasman Councils.

Prior to COVID-19, in 2018:

- more than 20% of passengers that arrived in Nelson through Nelson Airport would not have travelled to Nelson without the Airport
- Nelson Airport contributed $5 million to GDP directly, with $13.6 million in total induced in the economy, and
- a further $99 million expenditure by tourists and passengers was attributed to Nelson Airport in 2018.

There is significant commercial activity in the precinct of the Airport, with businesses owned by the Airport, as well as key complementary businesses existing solely due to the Airport's presence.

The Airport brings in further business to the wider region through tourism and trade, creating opportunities for local businesses to provide service to those that do not live in Nelson, both by flying people into the region, and giving businesses the opportunity to freight their goods to another city efficiently. In some cases, the Airport allows businesses to reach customers they would not be able to otherwise access.

The availability of Nelson Airport allows for the region – which continues to show steady growth – to be accessible for people to move to, and gives flexibility of travel for events, tourism, visiting friends and family, and more.

In the following sections, the economic benefits of Nelson Airport to the region are discussed in more detail and the Airport's economic contribution (in terms of GDP and employment) are presented.

Airport and precinct

Airport and precinct activity can be broken down into Nelson Airport operations, and the operations of companies using the Airport (airport-associated companies). Airport-associated companies have been grouped into five categories – airport services, air services, air-related services, aircraft servicing, and maintenance and visitor services.

This includes the activities undertaken by the Airport itself, including running an effective airport and the activities undertaken by businesses that function or operate as a result of the Airport. Examples include private companies providing services such as airlines, car rental companies, helicopter tours, retail outlets, aircraft engineering and maintenance, and businesses based on air services.

Economic benefit from capital expenditure

Over the last two financial years (2020/21 and 2021/22), Nelson Airport invested an average of $2.5 million per year. While this level of investment was below budgeted amounts, largely in response to COVID-19 related uncertainties, there is an expectation that deferred capital works will be undertaken in the future. In addition, we are estimating significant capital expenditure of $23.3-$25.6 million if the Northern runway extension option is chosen as the preferred option (and more if the Southern option is chosen).

In addition to Nelson Airport's capital expenditure, over 30 companies have been identified that operate as a result of Nelson Airport. These organisations have also invested in the region and while the amount of investment has not been quantified for the purposes of this report, our engagement with businesses as part of the 2019 report indicate that the level of investment is significant to the Nelson Tasman region.

Economic benefit from operational expenditure

The major activities that incur operational costs for Nelson Airport relate to the provision of infrastructure and facilities for aircraft landing and servicing, airline and land-side processing of passengers and freight to and from the aircraft. In the financial year to June 2022, the Airport incurred operating and administration costs of $5.8 million.

As with the capital investment, airport-associated companies (comprising airport services, air passenger services, air-related services, aircraft maintenance, and visitor services) would not exist in the Nelson Tasman region without the Airport. As such, their economic activity can be attributed to Nelson Airport.

Tourism and trade

The largest quantifiable contribution to the Nelson Tasman economy that can be attributed to Nelson Airport is visitor expenditure. That is, travellers (business and holiday) visiting the region.

Visitors

Air services facilitate the arrival of visitors to an area – for business as well as leisure. Nelson Tasman, with its climate, geography, activities, and amenities, is a major visitor destination in New Zealand, for domestic and international travellers. Because of its location, and the time required to access the Nelson Tasman region by road, the Airport is a major entry and exit point for visitors.

Spending by these visitors supports a wide range of visitor-related businesses, including: hotels; restaurants; entertainment and recreation facilities; and, car rentals. Analysis from 2019 estimated that Nelson Airport was responsible for about 15% of all visitor expenditure in the Nelson Tasman region.

Conferences and events

Conferences and events are a key part of the region's development strategy. These would be unlikely to occur, or be achieved to the same scale, without the level of air services out of Nelson Airport.

The Nelson Tasman region promotes itself as a conference and events centre. Conferences and events, attracting attendees from throughout New Zealand and globally, would not be viable without air transport links into the region.

Hosting events encourages migration, increases visitor numbers and gives residents a sense of pride and engagement in the community. Recent examples of sports events include the Cricket World Cup, Masters Games, and hosting the All Blacks. In addition, there are music and artisan events such as the biannual Adam Chamber Music Festival, the Nelson Arts Festival or Feast for the Senses.

Prior to COVID, conferences had a material benefit to the region and, while the pandemic impacted the level of activity significantly, conferences and events are expected to return to the region again in the future.

International students

There is a strong correlation between where international students' study and accessibility to air services. Prior to COVID-19, there were over 1,700 international fee-paying students in the Nelson Tasman region studying at primary and secondary schools and tertiary institutions. On average, international students spend about $30,000 a year as well as other benefits, such as from students' families visiting the region during their time of study.

Out-of-region students

The region also benefits from students who have come from other parts of New Zealand to study at tertiary providers in Nelson Tasman. They are attracted by either the lifestyle or the unique courses provided in the region. These students and their visiting friends and families often travel by air, especially if they are from the North Island.

Business operations and productivity

The benefits from airports on business operations and productivity can be described according to three categories.

- Trade – air transport provides connections to export markets for both goods and services.
- Investment – a key factor many companies consider when making decisions about the location of offices, manufacturing plants or warehouses is proximity or access to an international airport.
- Productivity – efficient air services can reduce transport costs and provide access to a larger market resulting in lower costs and opportunities for scale. Air access also enables companies to attract and retain high quality people, further increasing productivity.

On this last point, airports have been found to have a bigger effect on economic development by moving people as opposed to cargo.[5] This is the case for Nelson Airport,[6] which allows businesses to move people in and out of the region to support their business activities, and export businesses can operate nationally and globally out of Nelson Tasman. As noted in the passenger movements section, about a third of all passengers in 2018 were business travellers.

Due to the nature of the region's industries, most products freighted out of the region go by road or through Port Nelson. In these instances, the movement of freight is not the main value of the Airport, particularly as most goods produced in Nelson Tasman are more suited to road or sea freight.

However, the Airport does support several businesses and industries which require the ability to move time-sensitive products and transport people – employees, clients, and suppliers. Examples where the movement of intermediate goods used in local operations are time sensitive include:

- seafood producers moving their product to markets around New Zealand
- water samples for testing at Cawthron Institute, and
- vital parts for machinery or ships situated at Port Nelson.

Catalytic

Connectedness

The Airport's role in moving passengers and freight, combined with the location of the Nelson Tasman region within New Zealand, means that the Airport enables the region to deliver on its development and growth aspirations.

[5] Florida, Mellander, & Holgersson, 2015.

[6] Confirmed through interviews with businesses in the region undertaken in 2018.

There is a close connection between airports and regional development. An international study found that a 10% increase in passengers generates a 1% increase in regional employment, although the contribution is greater to knowledge and service-based businesses than industrial manufacturing.[7]

The Nelson Tasman region has higher than expected air passenger movements relative to employment, number of firms, and population. One study[8] suggests that this is because it is:

- a large economic centre in a unique location at the top of the South Island
- relatively difficult to access via road transport from the surrounding urban areas, and
- an effective way to conduct business with the lower North Island.

Talent attraction and retention

Airports play an important role in attracting talented people to an area. There are positive associations between airport passengers, population, and employment growth.

The existence of Nelson Airport is a key decision factor for people exploring the idea of moving to Nelson Tasman. This is especially the case for professionals who move to Nelson from a major centre in New Zealand or overseas. It is important that they can maintain their connections and have easy access to their employer's offices and customers located in other centres around New Zealand.

Aside from employment opportunities, there are several reasons for people wanting to move to the Nelson Tasman region. While the region is relatively small and does not have some of the same amenities and opportunities as larger cities, the Airport provides an easy means of travel so that people don't have to miss out on the experiences that a larger city offers.

Resiliency and emergency management

Airports play a role in resiliency and emergency management, which is an important service for residents and businesses alike.

Airports are an essential part of a disaster response, especially in rural areas and places that are difficult to access. A functioning airport is necessary to ensure that when an emergency that affects access routes occurs, civil defence crews can get there quickly and bring in necessary equipment. Airports are also critical if land transport networks are affected by natural disasters (for example, in earthquakes and in this regard service as critical lifeline utilities).

Similarly, airports are necessary to enable emergency health services. The ability to transport seriously ill residents to the appropriate care facility is a health-related function that residents have come to expect.

Nelson Marlborough Rescue Helicopter Trust operates out of Nelson Airport. The Trust contracts emergency and rescue services from GCH Aviation. In 2018, over 500 people were rescued/ transported by the Nelson Marlborough Rescue Helicopter.

[7] Florida, Mellander, & Holgersson, 2015.

[8] Market Economics, 2016.

Council owners

Nelson Airport is a strategic asset for the region. As well as facilitating business and attracting and retaining talented people, the Airport is a key part of the region's plans to deliver regional development outcomes for its owners, Nelson City Council and Tasman District Council.

Nelson Airport has been paying regular dividends to its council owners at levels which have increased each year since 2015. Dividends from 2017 to 2022 are shown in Table 1.

Table 1: Nelson Airport dividends, 2017-2022

	2017	2018	2019	2020	2021	2022
Airport dividend	$720,000	$750,000	$800,000	$850,000	$1,000,000	$1,100,000

Source: Nelson Airport Annual Reports (Financial Year)

Nelson Regional Development Agency (NRDA)

The NRDA is a council-controlled organisation (CCO) 100% owned by Nelson City Council. It exists to enhance the sustainable economic vitality of the Nelson Tasman region. The figure below shows the region's aspirations framework based on five pillars that provide an authentic reflection of the region and what it wants to continue to be. Nelson Airport especially aligns to the "highly connected" pillar and contributes to several of the other pillars as well.

Table 2: Five pillars for Nelson Tasman development

Clever business	Stunning natural landscapes	Surprisingly diverse	Highly connected	Arts and artisans
Pure grit and clever thinking have fashioned an extraordinary business story.	Even on an ordinary day, we live amongst extraordinary nature.	In our extraordinarily diverse city and towns we live and work together as one.	It is easy to live an extraordinary life here while being connected to each other, the rest of New Zealand and the world.	There is an extraordinary depth of heritage, artists, and artisan businesses here.

Source: NelsonTasman.nz, Nelson Tasman Story

The Airport contributes to the region's GDP and employment and enables business growth across industries

To give a sense of the size of the contribution to the Nelson Tasman region by Nelson Airport, we have brought across the analysis about GDP and employment from our 2019 report. While the scale of this contribution diminished during the COVID pandemic due to the limitations on domestic and international flights, we expect the significant historic economic benefits to the region will return.

Based on the analysis in 2018, Nelson Airport was indirectly responsible for about 15% of all visitor expenditure in the Nelson Tasman region which accounted for 3.37% of the region's GDP. In addition, the Airport enabled other businesses such as seafood producers, to make meaningful contributions to the region's GDP and employment in their own right.

The tables below show both the direct and total impact of the Airport on GDP and employment. Figures are grouped according to impact of operational and capital expenditure by the Airport and airport-associated companies, and expenditure by visitors who came to the Nelson Tasman region because of the Airport.

Direct impacts are those that are generated by the initial expenditure associated with the Airport. **Total impacts** are a function of direct impacts plus the impacts of businesses or people directly involved with the Airport who then purchase materials, goods, and services from supplier firms, who in turn make further purchases from their suppliers and so forth. Total impacts also include induced impacts which occur when employees in those businesses providing the materials, goods, and services, are paid wages and the enterprises generate profits that are then spent on consumption within the region.

The direct impact of Nelson Airport in 2018 is shown in Table 3. Combining the four areas of economic impact results in total direct expenditure of $198 million. This flows through to a direct impact to GDP of $95.1 million and 1,714 full time jobs for one year.

Table 3: Direct impact of Nelson Airport, 2018

2018 Direct impacts	Output ($000)	GDP ($000)	Employment (FTEs)
Nelson Airport capital expenditure	16,915	4,990	56
Nelson Airport operating expenditure	3,706	1,720	45
Associated business expenditure	78,451	33,220	494
Visitor expenditure attributable to Nelson Airport	99,010	55,131	1,119
TOTAL	**198,082**	**95,062**	**1,714**

Source: MartinJenkins: Nelson Airport's contribution to the Nelson Tasman economy, 2019

Table 4 shows the total impact of Nelson Airport on the Nelson Tasman economy in 2018. When indirect and induced impacts are included, the total economic impact of the Airport on the Nelson Tasman economy in 2018 is estimated at $178 million in GDP and 3,091 full time jobs.

Table 4: Total impact of Nelson Airport, 2018

2018 Total impacts	Output ($000)	GDP ($000)	Employment (FTEs)
Nelson Airport capital expenditure	35,657	13,646	156

Nelson Airport operating expenditure	6,447	3,209	110
Associated business expenditure	138,185	65,478	1,287
Visitor expenditure attributable to Nelson Airport	175,363	95,669	1,538
TOTAL	**355,652**	**178,002**	**3,091**

Source: MartinJenkins: Nelson Airport's contribution to the Nelson Tasman economy, 2019

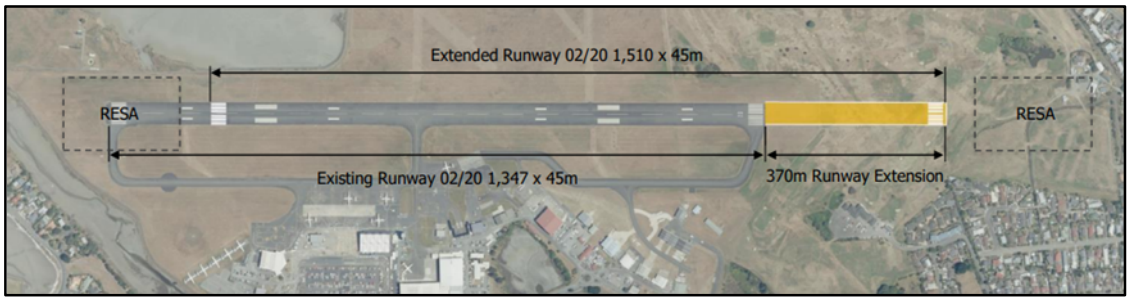
Part 2: Comparison of the northern and southern runway extension options

Two runway extension options are being considered

The Northern option extends the runway over land currently owned by Nelson Golf Club

Option A involves a northern displacement of the existing runway to provide for a 240m southern RESA, together with an extension of the runway length from 1,347m to 1,510m and a 240m northern RESA as shown below in Figure 1.

Figure 1: Option A: Northern runway extension



The Southern option extends the runway over Jenkins Creek and Point Road

Option B involves an extension of the existing runway by 163m to the south to achieve a 1,510m runway length. This option would require earthworks and structure to be built across Jenkins Creek to extend the runway and to allow room for a RESA. Point Road would need to be diverted in some way, either by positioning the road on reclaimed land south of the new RESA in the Waimea Estuary or building a tunnel underneath the RESA.

Figure 2: Option B: Southern runway extension

Source for figures 1 and 2: Nelson Airport Limited

We assessed the options using 3 main economic criteria

1. **Economic costs** of construction activity associated with runway extension, ground works and supporting infrastructure, compared against the average annual expenditure of Nelson Airport.
2. **GDP and employment creation to the Nelson Tasman region** due to construction costs of the runway extension, compared against the region's GDP and employment levels.
3. **Ability to achieve Nelson Airport's objectives** associated with increased reliability (reduction in payload restrictions), safety (provision of RESA) and resilience (future proofing for newer renewable fleet mixture).

The Northern runway extension option is more economically efficient compared to the Southern option

Summary

Both options provide similar economic benefits to the region, and contribution towards the Airport's objectives. However, because the Southern option will likely require a much longer, uncertain and more technical construction process, the Northern option has a relatively lower economic cost of construction.

The following section summarises the assessment of the alternative options against each of the criteria. Appendix 2 summarises the assessment of the two options using a multi criteria analysis.

Criteria 1: Economic costs of a runway extension

We estimated the high-level costs of the Northern and Southern options, focussing on the additional costs that would be incurred in the Southern option. The cost estimate incorporates materials, labour, planning, and land acquisition/ property rights. Appendix 1 lists the key assumptions used in the cost estimate.

We presented our cost estimate using a range to reflect the level of uncertainty about some of the assumptions we have used

Our approach to determining a range began with an estimate of the total cost of each option and used modelling techniques to better reflect the uncertainty that exists in each of the main elements of the options. For each option, we conducted high level statistical modelling and Monte Carlo simulation on the key risks.

We assumed the main uncertainty for the Northern option is construction cost inflation over the medium term. For the Southern option, it is both the uncertainty in construction cost as well as the risk that the larger earthworks programme and civil engineering requirements are much more complex and costly than currently estimated.

The resulting probability distribution provided a range of costs that are likely to occur, with the Southern option having a wider range due to its higher risk. In this report, the upper end of the range is based on 85% of the simulations that were run on that option.

All cost estimates are indicative only and should not be used for budgeting or funding purposes

The cost estimates are based on other airport and infrastructure projects from around New Zealand using information solely provided by Nelson Airport, Stantec[9] and MartinJenkins. The cost estimates are not based on specific information about Nelson Airport. For example, the uncertain nature of ground conditions and settlement of the land surrounding the Airport.

There are some key elements in the Southern option that require further investigation, the outcome of which may materially increase the cost estimate presented in this report. For example, the solution for diverting Point Road may involve building a new road either around or under the RESA.

The cost estimate is currently based on a section of new road south of the RESA, however should a tunnel be identified as the preferred solution, the cost of the Southern option could increase by an extra $50-100 million.

Based on a comparative analysis of other airport and infrastructure projects, the Northern extension option is estimated to cost between $26.0m–$30.5m

The primary cost items for the northern extension are acquisition of the required golf course land and paving the runway extension.

The tables and figures below show the costs for the Northern option. Construction is estimated to occur over two years but land acquisition and other costs to begin the project will commence earlier. The operational expenditure has been calculated for the first year after construction, as an average annual cost of maintenance based on a percentage of the construction cost.

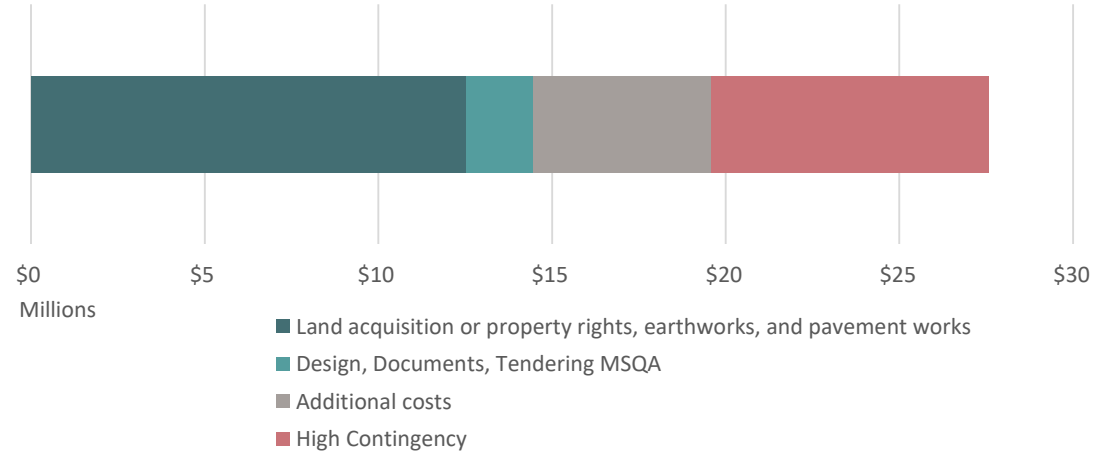
Table 5: Economic costs of the Northern extension option

Main costs for the Northern option	$million
Land acquisition, property rights, earthworks, and pavement works	12.5
Design, Documents, Tendering MSQA	1.9
Additional costs	5.1
Contingency	3.5 – 8.0
Total runway extension costs	**26.0 – 30.5**
Plus, operational expenditure (maintenance and ongoing costs)	3.1 – 3.5 (0.2 per annum)

[9] Stantec provided estimates for the Southern Extension based on the requirements of s171 of the RMA that 'alternatives' are considered in the assessment of a Designation Notice of Requirement. Stantec would not recommend the Southern Extension Option as a viable engineering proposition.

Source: MartinJenkins analysis

Figure 3: Cumulative costs of the Northern extension option



Source: MartinJenkins analysis

By comparison, the Southern option is expected to require significantly more infrastructure investment and cost approximately double that of the Northern option

The key infrastructure components in this option are earthworks and civil engineering costs to enable the construction of the extended runway over Jenkins Creek, as well as either a new section of road south of the RESA in the Waimea Estuary, or a tunnel under the RESA to divert Point Road.

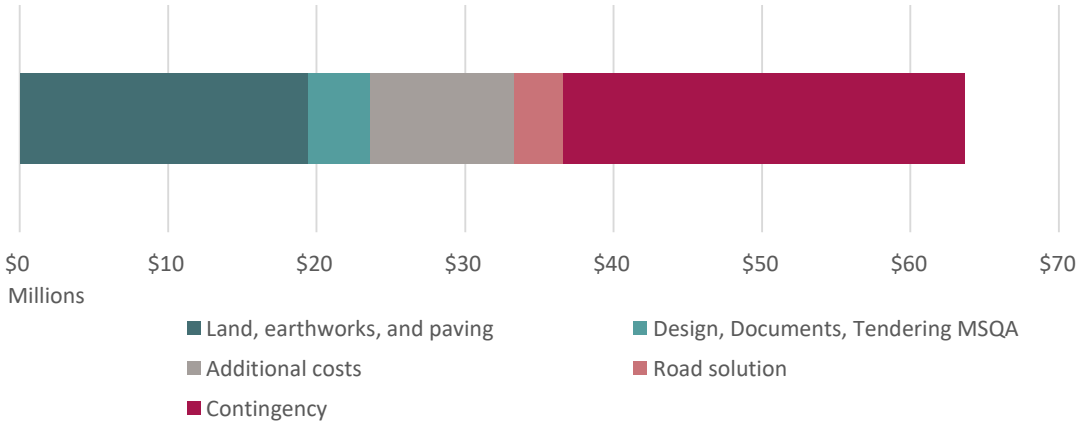
The tables and figures below show the costs for the Southern extension option. Construction is estimated to occur over three years but land acquisition / property rights and other costs to begin the project are assumed to begin earlier. Like the Northern option, operational expenditure is as an average annual cost of maintenance based on a percentage of the construction cost.

Table 6: Economic costs of the Southern extension option

Main costs for the Southern option	$million
Land acquisition, property rights, earthworks, and pavement works	19.4
Road solution	3.3
Design, Documents, Tendering MSQA	4.2
Additional costs	9.7
Contingency	13.3 – 27.0
Total runway extension costs	**52.9 – 63.3**
Plus, operational expenditure (maintenance and ongoing costs)	7.2 – 8.5 (0.5 – 0.6 per annum)

Source: MartinJenkins analysis

Figure 4: Cumulative costs of the Southern extension option



Source: MartinJenkins analysis

Criteria 2: GDP and employment creation to the Nelson Tasman region

An economic impact analysis was used to assess the two runway extension options

Consistent with the agreed scope of work, the economic impact analysis presented in this section is narrower in scope than the 2019 report. We estimated the Airport's contribution to the region in terms of GDP and employment as a result of:

- construction activity associated with the runway extension
- ongoing operational maintenance of the runway and any associated infrastructure, and
- economic activity generated by the expenditure of visitors to the Nelson Tasman region because of the Airport.

Our analysis did not consider any impact to the region from businesses that exist because of the Airport (either now or in the future). Appendix 1 lists the key assumptions used in the analysis.

The economic impacts for the Northern and Southern extension options are mainly driven by construction activity

We assumed that there is no impact on expenditure due to visitor numbers, as neither runway extension is expected to materially change the number of visitors to the Nelson Tasman region. We also assumed no change to other operating activity associated with the Airport, beyond maintenance of the runway and other infrastructure associated with the extension.

Operating and capital expenditure figures were derived from the cost estimates for the Northern and Southern options. Expenditure was allocated to various industry groups (for example construction and tourism) and whether

the spend would occur locally in the Nelson Tasman region, or somewhere else in New Zealand. For example, we assumed local quarries would provide all infill needed for the Southern option.

The runway extension is estimated to increase regional GDP by $16 – $27 million in the year of construction, depending on the runway extension option

The Northern option is estimated to result in an additional $15.5 million of GDP and 133 jobs, compared to the scenario where the runway is not extended.[10] This includes direct, indirect, and induced activity from the Northern extension, which all contribute to the total economic impact for the region.

As the level of expenditure is a key driver of economic impact, and a Southern extension option is estimated to cost much more than the Northern extension, extending the runway to the south results in greater economic impact in the year of construction (in terms of this assessment criterion) – of around $11.7 million more in GDP than the Northern option and 104 FTEs in additional employment.

Neither option on its own provides a large economic benefit to the region and the impacts on output, GDP, and employment are likely only temporary. Both the northern and southern options would contribute less than 1% of the GDP of the Nelson region in the year of construction, and less than a 0.5% change in the employment in the Nelson region. However, notwithstanding the option chosen to extend the runway, significant economic benefits (as explained further below) would continue to accrue to the Nelson Region because of the operational airport.

The additional economic impacts of each option in the year of construction, compared to a 'no-runway extension/ base case option' are provided in the table below.

Table 7: Additional value and employment resulting from runway extension

Incremental economic impact in the year of construction	Northern option	Southern option
Output ($)	+ $32.9 million	+ $58.7 million
GDP ($)	+ $15.5 million	+ $27.2 million
Employment (FTES)	+ 133	+ 237

Source: MartinJenkins analysis

Notes

1 Figures are incremental to a base scenario for airport activity in the year of construction where the extension is not built. All dollars exclude GST, are high-level estimates only, and provided in 2022-dollar values.

Criteria 3: Ability to achieve Nelson Airport's objectives

Nelson Airport's objectives for the construction of a runway extension are:

[10] A base case/ no runway extension option reflecting airport activity in the year of construction was run, as a basis for incremental impacts. This base case assumes Nelson Airport does not undertake any capital expenditure in place of the runway extension (in the measured year).

- resilience (future proofing for newer renewable fleet mixture)
- increased reliability (reduction in payload restrictions), and
- safety (provision of RESA).

The design of both runway extension options is such that they broadly achieve the same level of project objectives. This is discussed further below.

Reliability

Under certain weather conditions passenger and freight capacity is limited, impacting reliability for travellers, businesses and their customers. A runway extension (in either direction) would allow Nelson Airport to increase passenger and freight capacity whenever these conditions occur. Climate change may increase the frequency of these types of weather conditions in the future.

Safety

While Nelson Airport's runway configuration is fully compliant with Civil Aviation Rules, an extension to the runway will trigger the need for RESA at both ends of the runway. The RESA will provide additional safety features for the airport by providing space for aircraft undershoot or overshoot incidents.

Resilience

One key area of focus in the aerospace industry over the past few years is the development of sustainably powered and zero emission planes. New zero emission (or low emission) aircraft options are expected to become available for Nelson Airport's airline customers in the near to medium term (approximately 2030-2035). Expert advice is that these aircraft are likely to require comparatively longer runways than the aircraft they replace. Nelson Airport's runway extension plans are directly targeted at ensuring it can accommodate future sustainably powered aircraft.

Appendix 1: Key assumptions used in the analysis

Airport construction and impact on visitor numbers

The runway construction will be completed in 10-15 years

- The Northern and Southern runway extension projects are expected to have very different levels of complexity and the Southern runway extension will require more time to be built. We have allowed 2 years for the Northern runway extension construction, and 3 years for the Southern, with the same complete project timeline for consistency.

Passenger numbers are not expected to materially increase as a result of the runway extension, and are the same under both the Northern and Southern options

- We have also assumed that the Airport would be able to manage the demand for flights in 2039 without a runway extension.

Economic cost estimate

Level of certainty about estimates presented in the report

- Our estimates are indicative only and based on other infrastructure projects across New Zealand using information provided solely from Nelson Airport, Stantec, and MartinJenkins. They should not be used for budgeting or funding purposes. The estimates do not account for factors specific to Nelson Airport, such as surrounding land conditions.
- There are some key elements in the Southern option that require further investigation, the outcome of which may materially increase the cost estimate presented in this report. For example, the solution for diverting Point Road may involve building a new road either around or under the RESA (ie diverting Point Road). The cost estimate is currently based on a section of new road south of the RESA, however should a tunnel be identified as the best solution, the cost of the Southern option could increase by an extra $50-100 million.

Expenditure

- Operating expenditure in the financial model is assumed to be constant with the following exceptions:
    - We have estimated that the average annual maintenance will be 1% of the total construction cost of the runway extension annually from the year after construction begins.
    - We have also estimated that other ongoing costs will be 0.25% of the total construction cost of the runway extension annually from the year after construction begins.

Inflation rate

- Figures are provided in current, 2022-dollars, exclusive of any GST, and are not inflated over the construction period.
- Estimates for construction materials, resource consents, and land acquisition have been calculated as of December 2022.

Land acquisition or property rights

- Land or property rights are assumed to be acquired/ secured in advance of constructing either runway extension option.
- The prices estimated for any land acquisition have been calculated based on land value around the proposed acquisition area. For reasons of commercial sensitivity, we have not identified the dollar value of any land acquisition or property right in this report.

Construction costs

- We have assumed that local quarries would be able to provide all infill needed for the Southern option.

Contingency and additional costs

- The additional costs consist of preliminary and general costs, as well as miscellaneous costs, provided to us by Stantec.
- The contingency costs include estimates provided by Stantec and output from a high-level Monte Carlo simulation. The Monte Carlo simulations informed an upper- and lower-end cost range.

Depreciation rate

- We have assumed that the depreciation of the runway will occur on a straight-line basis, at 4% over a 50-year timeframe, as per Treasury guidelines.

Assumptions used by Stantec

The following assumptions were provided to us by Stantec and are repeated below.

General assumptions

- Stantec has no control over the cost of labour, materials, equipment or services furnished by others, over contractors' methods of determining prices or over competitive bidding or market conditions.
- Any opinion or estimate of costs by Stantec is to be made on the basis of Stantec's experience and qualifications and represents Stantec's judgement as an experienced and qualified professional engineer, familiar with the construction industry.
- Stantec cannot and does not guarantee that proposals, bids or actual construction costs will not vary from Stantec's estimates.
- Actual prices and results may be materially different from any forecast, opinion or expectation expressed.

- For both options, all approvals required to construct the proposed runway extension have been obtained.
- Dimension for the extensions and RESA were obtained from the notice of requirement assessment report.[11]
- Where cut/ fill is required, a slope of 2 Horizontal : 1 Vertical is used between existing ground to the designated elevation for each option to calculate the volume in Civil3D package.
- Stantec assumes that 80% of cut in-situ material will be suitable and be used for filling, except marine sediment from Jenkins Creek. This is subject to change once results of ground investigation/ laboratory tests are available at investigation phase and may increase construction cost.
- Ground improvement for the proposed runway extension and RESA fill embankment is not considered as no sufficient amount of ground investigation data is available. This is subject to change once results of ground investigation/ laboratory tests are available at investigation phase and may increase construction cost.
- Runway flexible pavement requirement were assumed based on 24 inbound flights per day, 20-year design life, and California Bearing Ratio 3%. Asphalt 250 mm + binder, subgrade AP65 400mm and AP40 100mm. Rates used for asphalt and subgrade have been checked with a local supplier.
- The RESA and runway extension are considered to be operationally linked.
- 40% of total construction cost estimation was considered as preliminary and general items, accounting for potential construction delay, ie fill embankment construction, and temporary works.
- 15% of total construction cost estimation is considered as a contingency item, accounting for unknown items.
- 15% of total cost estimation is considered as a design, construction documents, tendering and construction monitoring (MSQA).

Southern extension assumptions

- Southern extension 163 m long x 45 m wide, and RESA 240 m long x 150 m wide are used to calculate quantities. The cost estimate was based on an estimate by Stantec and adjusted by MartinJenkins to account for a wider RESA (an additional 30 metres).
- The elevation at southern-end runway was adopted, RL 2.5 m, and this level was extended to match the elevation at Point Road, RL 3.1m with respect to NZVD 2016 Datum to extend Southern RESA.
- Based on a Tonkin&Taylor report, High Astronomical Tide and Mean High Spring Water level are at R.L 2.1 m and 1.75 m NZVD2016. Sea level rise associated with climate change is not considered.
- Point Road is either tunnelled or relocated South of the RESA (noting there are concerns with the feasibility to tunnel Point Road from an engineering perspective). The cost of relocating the road was estimated by MartinJenkins using input costs that Stantec provided. The cost of relocation has not been reviewed by Stantec. It is likely that the Southern option would require much higher capital expenditure if alternative design solutions for the road are used.

[11] Stantec: Designation Notice of Requirement Geotechnical and Coastal Assessment; September 2022.

- We assume that Jenkins Creek will be diverted, creating an open channel through the Monaco Peninsula. The elevation at the open channel bed was adopted from the elevation at the Jenkins Creek bed.
- Open channel slope (2H:1V) is assumed to be stable without treatment but grassed. This is subject to change once results from geotechnical investigations are available and slope stability assessment will confirm its stability.
- Rock revetment for the southern RESA fill embankment was considered to reduce erosion impact and dimension and its material will need to be determined during design.
- Stantec assumes that the DVOR facility will need to be relocated to inland (northern end).

Northern extension assumptions

- Northern extension 370 m long x 45 m wide, and RESA 240 m long x 150 m wide are used to calculate quantities. The cost estimate was based on an estimate by Stantec and adjusted by MartinJenkins to account for a wider RESA (an additional 30 metres).
- The elevation at Northern-end runway was adopted, RL 3.5 m, and this level was maintained and extended to the proposed northern RESA area, with respect to NZVD 2016 Datum.
- The southern RESA is already provided; thus, not included in the cost estimation.
- Strip topsoil and further treatment is not required in RESA area with exception of existing stream area near golf course.
- The Maire Stream will be piped or realigned.

Economic impact analysis

General assumptions

Expenditure

- Operating expenditure by Nelson Airport and associated companies increases by 40% to the year 2039. This is based on the assumption that the companies will grow with passenger growth over this period and in line with the breakdown of business in 2018. Employment in the Airport and associated companies also increases by 40%.
- We have assumed that all other capital expenditure by the Airport will be zero for this model. Any extra capital expenditure on top of the construction of the runway extension will be similar regardless of which option is chosen.
- In line with economic impact assessment methodology, we assumed capital expenditure associated with building the runway extension will occur in one year. Operating expenditure as a result of the runway extension is captured for one year.
- The output, GDP, and employment figures are provided in 2022 dollars, reflecting activity that we assume will take place in approximately 10-15 years.

Passengers

- We have applied the passenger forecast provided to us by AirBiz and used a 15-year timeframe to simulate passenger growth to account for when the runway extension will be in place.
- We have assumed that the passenger profile of Nelson Airport has not changed since 2018. Specifically:
    - The split between business, tourist, and local passengers through Nelson Airport is evenly split at 33% respectively (local residents account for 34% of passengers).
    - The split between international and domestic passengers travelling for business and to visit will stay consistent, with 95% of business passengers, and 81% of visiting passengers being domestic.
    - The average daily spend of visitors has remained constant since 2018, only being increased by inflation.

Technical assumptions

Direct, indirect, and induced impacts

The EIA applies regional multipliers to determine the direct, indirect, and induced effects of the initial expenditure. The activity is measured using Gross Domestic Product (GDP) and employment (FTEs).

- **Direct impacts** are those that are generated by the initial expenditure associated with the Airport.
- **Indirect impacts** occur when those businesses or people directly involved with the Airport then purchase materials, goods, and services from supplier firms, who in turn make further purchases from their suppliers and so forth.
- **Induced impacts** occur when employees in those businesses providing the materials, goods and services are paid wages and the enterprises generate profits that are then spent on consumption within the region.
- In this report we have discussed the impacts from Nelson Airport as direct impacts, which are solely the impacts deriving from the first point in this list, and total impacts, which summate all impacts from this list.
- To calculate these impacts, we have used output multipliers from Butcher Partners Ltd, which were based on the inter-related industries in the New Zealand economy in 2019/20.

Additionality and displacement

- The Input-Output multiplier analysis assumes that the activity or event being analysed is new activity and does not displace existing activity.
- Additionality and displacement need to be considered separately before the activity is inputted into the model. This is particularly relevant when looking at visitor activity, where visitors have alternative options for getting into and out of the Nelson Tasman region.

Static model

- It is assumed that an activity will not have an impact on relative prices.
- Due to the size of the local economy, and the types of inputs purchased, it is unlikely that the Airport's activities will influence prices for other products or services.

Aggregation and accuracy of multipliers

- Each industry has its own unique inputs and outputs and thus multipliers. The more aggregated the level of analysis, the less accurate these inputs and outputs become. It is therefore important to apportion the initial expenditure to the industry where it occurs.
- With regards to aggregation limitations impacting on accuracy, expenditure has been broken down into individual expense areas and then allocated to the most relevant industry. The current analysis allocates activity across separate industries, which provides a higher level of accuracy.
- Visitor expenditure is assigned to industries based on the breakdown of spend identified through the Regional Tourism Estimates and the assignment of activity in the Tourism Satellite Accounts.

Regions and Boundaries

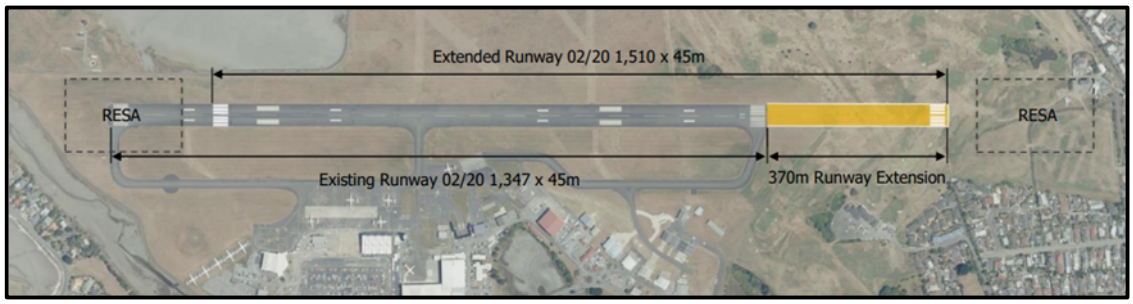
- The smaller or less defined a region and its boundaries, the less accurate the multiplier analysis will be. Similarly, the easier it is to move across boundaries, the less accurate the analysis will be.
- Geographically, the Nelson Tasman region is positioned so there is likely less (or clearer) movement of activity across geographic boundaries. This suggests that the level of accuracy of the regional multipliers may be higher.

Appendix 2: Summary of multi criteria analysis

Introduction

The Northern option extends the runway over land currently owned by Nelson Golf Club

Option A involves a northern displacement of the existing runway to provide for a 240m southern RESA, together with an extension of the runway length from 1,347m to 1,510m and a 240m northern RESA as shown in the below Figure 1



Source: 2050 Airport Master Plan, Nelson Airport

The Southern option extends the runway over Jenkins Creek and Point Road

Option B involves an extension of the existing runway by 163m to the south to achieve a 1,510m runway. This option would require earthworks and structure to be built across Jenkins Creek to extend the runway and to allow room for a RESA. Point Road would need to be diverted in some way, either by positioning the road on reclaimed land south of the new RESA in the Waimea Estuary or building a tunnel underneath the RESA.

Source: Nelson Airport Limited

Criteria

To assess each option, we have developed the following economic criteria:

1. **Economic costs** of construction activity associated with runway extension, ground works and supporting infrastructure, compared against the average annual expenditure of Nelson Airport.

2. **GDP and employment creation to the Nelson Tasman region** due to construction costs of the runway extension, compared against the region's GDP and employment levels.
3. **Ability to achieve Nelson Airport's objectives** associated with increased reliability (reduction in payload restrictions), safety (provision of RESA) and resilience (future proofing for newer renewable fleet mixture).

Scoring

Each option is assessed against the base case (no runway extension) using a scoring system of -3 (significant adverse effect) to 0 (neutral/no change) to +3 (significant positive effect), as shown in the table below.

Effects / Outcome criteria	Scoring
Significant adverse effect / substantial negative effect on the project outcome	-3
Moderate / Major adverse effect	-2
Minor adverse effect	-1
Neutral / no change	0
Minor positive effect	1
Moderate / Major positive effect	2
Significant positive effect / achievement of project outcome	3

Summary of analysis

Table 8: Multi-criteria analysis scoring and notes

Economics Criteria	Score for Northern Extension Option	Score for Southern Extension Option	Notes
Construction Costs	**-1**	**-3**	Total costs for the northern extension option are estimated at between ($26.0m – $30.5m)

Economics Criteria	Score for Northern Extension Option	Score for Southern Extension Option	Notes
			Total costs for the Southern extension option are estimated at between ($52.9m – $63.3m)
GDP and Employment Creation (including multiplier effects)	**1**	**1**	Extending the runway creates the following output, GDP, and employment over the 3-year construction window: ***Northern option:*** Output: $32.9m GDP($): $15.5m Employment (FTEs): 133 ***Southern option:*** Output: $58.7m GDP($): $27.2m Employment (FTEs): 237 As the northern and southern options cause less than a 1% change in the GDP of the Nelson region, and less than a 0.5% change in the employment in the Nelson region, we have categorised them both as a minor positive effect.
Reliability, Safety, and Resilience Objectives	**2**	**2**	There are moderate positive economic benefits from achieving the project's reliability, safety, and resilience objectives. The runway extension provides for higher passenger and freight limits (reliability), provide for runway end safety areas (safety), and positions the Airport for future use by electric or hybrid planes (resilience). The runway extension options are scored the same because they both extend the runway to a length of 1,510m, and include the development of runway end safety areas (RESA).

Concluding Statements

The construction costs of extending the runway north are significantly less than extending the runway south. This is due to the geographical challenges of building south, specifically the requirement to build the runway extension across an estuary. Both options cost significantly more than the current average annual operating expenditure from Nelson Airport, with the southern extension option priced at nearly double the northern extension option. The scoring assessment reflects this with a -3 for the southern option and a -2 for the northern option.

As noted in the report, the key direct and induced economic benefits from the runway extension relate to the construction costs associated with building the runway. As the southern option is substantially more expensive to construct than the northern option, the direct and induced economic benefits to the region and to New Zealand are larger (albeit as identified below, this does not constitute the most economically efficient option to achieve NAL's objectives for the Notice of Requirement).

As the Notice of Requirement is not predicated on substantially increasing future passenger and freight growth, neither option on its own provides a large economic benefit to the region. While both options provide positive impacts, they only have a minor effect on GDP and employment in the Nelson region and New Zealand. This is notwithstanding the significant economic benefits the Nelson Airport provides to the Nelson Region more generally as an operational airport.

Both the northern and the southern options create the same set of economic benefits for Nelson Airport by completing or improving on the Airport's reliability, safety, and resilience objectives. While there may be minor differences between the options, these differences are not great enough for us to differentiate them in the scoring assessment. The impacts that these have are large positive effects, allowing for higher passenger and freight limits, improving the safety of each flight, and providing security to the Airport that the runway is resilient to technological improvement in air travel.

Overall, the northern extension option is more economically efficient. If we look at the second and third criteria, we note that both the runway extension options create a minor positive effect to the local economy and the New Zealand economy, as well as creating moderate economic benefits to Nelson Airport in the form of improving on its objectives. While these benefits are quite similar between the options, the construction cost difference (the first criterion) is sizeable.

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