

## Memorandum

25 August 2016

To: Ian Gordon  
From: Kieran Murray  
Re: DLA e-mail of 29 July 2016

### Introduction

Our cost benefit analysis (CBA) quantifies the effect of the proposed extension to the Wellington runway on economic well-being; that is, it estimates the adverse economic effects (costs) and positive economic effects (benefits), and deducts the costs from the benefits to arrive at a net benefit estimate. These costs and benefits are estimated by applying the approach set out by the Environment Court (*Port Gore Marine Farms v Marlborough District Council*); that is by summing the net additions to producer surplus, consumer surplus, and positive externalities less negative externalities.

In response to the request from the Greater Wellington Regional Council (GWRC) for further information, dated 16 June 2016, we:

- extracted from the CBA the net economic benefits which are likely to accrue within the Wellington region
- provided an economic impact analysis showing the likely value add (the addition to GDP) for the Wellington region.

We cautioned that some of the information sought by the GWRC was unlikely to assist an economic assessment of the effect of the proposal on economic well-being. This is because a localized economic impact assessment, as sought, introduces further issues for an assessment of the effect on economic well-being. In addition to valuing some communities over others, a localized economic impact study considers the effects on economic *activity* (GDP, employment, income), which is at best a proxy measure for a change in well-being (net benefit), and at times a very poor proxy – the New Zealand Treasury provides the example of employing someone to dig a hole and fill it in again.<sup>1</sup> In addition to counting costs as benefits, the methods applied in economic impact assessments (input-output or multiplier analysis) tend to exaggerate the results as, amongst other assumptions, resources are assumed to be infinitely available – an assumption which makes economic impact assessments especially unsuitable for evaluating proposals to use scarce resources.<sup>2</sup>

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<sup>1</sup> New Zealand Treasury, Guide to Social Cost Benefit Analysis, July 2015, page 54.

<sup>2</sup> The New Zealand Treasury states that an economic impact assessment “is not suitable as a tool for measuring the balance of costs and benefits of a decision to society”. For a fuller discussion of why input-output tables are not suitable for evaluating the economic effects of a project, see ‘Paul Gretton, *‘On input-output tables: uses and abuses’* Australian Productivity Commission Staff Research Note, September 2013.

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Notably, the potential for misuse of multipliers in evaluating the economic effects of new projects has caused the Australian Bureau of Statistics to discontinue issuing them, explaining on its website that:<sup>3</sup>

*While their ease of use makes I–O multipliers a popular tool for economic impact analysis, they are based on limiting assumptions that results in multipliers being a biased estimator of the benefits or costs of a project...*

*While I–O multipliers may be useful as summary statistics to assist in understanding the degree to which an industry is integrated into the economy, their inherent shortcomings make them inappropriate for economic impact analysis. These shortcomings mean that I–O multipliers are likely to significantly over–state the impacts of projects or events.*

With these cautions re-stated, I respond below to the points raised by the DLA e-mail of 29 July 2016.

### With reference to the CBA:

In response to the s 92 request from GWRC, we separated out, from our assessment of the net benefits of the proposal, the net benefits to the Wellington region for the different cost and benefit segments considered in the CBA. Table 1 reproduces, unchanged, table 1 of our response to the GWRC letter of 16 June:

**Table 1 Net benefits to the Wellington region (\$m present value, 40 years, most likely scenario)**

Community segment	Net benefit	Assumption	CBA reference
Wellington Airport	\$87.2m	Excludes the costs of constructing the extension	Table 11 & 17
Airlines	\$0m	No ‘Wellington’ airline	
Passengers and freight	\$766.8m	Passengers who depart from and return to Wellington live within the region of interest	Table 13, 20
Local businesses/other sections of the community	\$512.1m	31% of additional visitor expenditure spent in Wellington region	Table,14, 28, less GST
<b>Net benefit to Wellington region</b>	<b>\$1,366.1 m</b>		

These net benefits to the Wellington region, of just under \$1.4 billion (in present value terms), contrast with the capital cost of the runway extension of about \$300 million (in present value terms).

I respond to the DLA queries following the same order as their e-mail:

- *It is not clear how Sapere derived the net benefit to the Airport (\$87.2m. Should this be \$80.7m?).*

Table 1 provides the references to the relevant tables in the CBA report. The arithmetic is: benefits to Wellington Airport (table 17) at \$118.188m,

<sup>3</sup>

<http://www.abs.gov.au/ausstats/abs@.nsf/Previousproducts/5209.0.55.001Main%20Features4Final%20release%202006-07%20tables?opendocument&tabname=Summary&prodno=5209.0.55.001&issue=Final%20release%202006-07%20tables&num=&view=>

*less*

costs to Wellington Airport (table 11) at \$30.953m, excluding the cost of constructing the runway;

*equals*

net benefits to Wellington Airport (not counting cost of construction) of \$87.2m as shown in table 1 above.

- The assessment takes the gateway effect (31%) and scales the costs and benefits accordingly (for the relevant segments).

No gateway 'effect' is reported in the CBA or in the further response to the GWRC letter of 16 June. The term 'gateway' refers to the point of entry for international visitors. Wellington would be the 'gateway city' for *additional* visitors once the runway is extended (that is, visitors in addition to the over 900,000 international passengers that currently use Wellington Airport).

To estimate the net benefit to 'local businesses/other sections of the community' segment of the Wellington community (the 4<sup>th</sup> segment listed in table 1), an estimate is required as to how much money the additional visitors would spend in Wellington, separate from how much they would spend in other regions. Official estimates are available (and were used) for how much is spent in New Zealand by visitors from each origin market, but there is no official data as to the *proportion* of the total a visitor spends in their chosen gateway city. Section 5.4 of the CBA explains how we derived our estimate of this proportion from data on visitor expenditure and visitor arrivals. We assume additional visitors arriving and departing from Wellington would spend, in Wellington, 31% of the amount they spend while in New Zealand.

This 'gateway analysis' is relevant only to the last of the four segments of benefit listed in table 1; that is, the estimated net benefit to 'local businesses/other sections of the community'. The 'gateway' analysis has no bearing on the estimated net benefits for the other three segments: Wellington Airport; Airlines; and Passengers and freight. The net benefit to Wellington Airport is estimated directly from the costs and benefits which would accrue to the airport; these costs and benefits flow from the additional arrivals and departures and are not influenced by whether the additional passengers spend their time in the Wellington region or elsewhere. Similarly, the benefits to passengers and freight users within the catchment area of the Wellington airport, which would result from savings in travel time and other cost reductions, are not impacted by the itineraries of international visitors. We excluded airlines from the estimate of net benefits for the Wellington region as none of the airlines affected are 'Wellington airlines'.

As shown in Table 1, the net benefits to passengers and freight within the airport's catchment are, on their own, twice the economic cost of constructing the extension. Hence, even if it were assumed that the additional visitors did not spend \$1 in Wellington (an assumption which would be fanciful) the net benefits to the Wellington region from the runway extension would still be twice as large as the likely costs even if the Wellington region were to face the entire burden of extending the runway.

Anecdotal evidence suggests that our assumption that the additional tourists would spend 31% of their total spend within Wellington is conservative. For example:

- on average 44% of all international visitors travel to New Zealand for business, education, or conferences, or to visit family and friends. If these travelers choose to fly

into Wellington, rather than Auckland or Christchurch, it is reasonable to consider that many would do so because Wellington is the location of their client or conference or close to where their family and friends live.

- about 60% of the additional expenditure by visitors is expected to be by visitors from China and ‘other Asia’. When people from these regions visit Australia (which collects data on time spent in and outside the gateway city), they spend about 80% of their nights in the gateway city.
- long-haul travel is tiring and many people are likely to find it convenient to spend some time in their city of arrival and departure. For example, visitors from China, who are New Zealand’s second largest market, spend on average 4 days in New Zealand. The gateway assumption implies those visitors would spend just over a day in Wellington.
- It is unclear if the assessment adjusts the spending to allow for international and interregional imports (importing by businesses to service visitors).

Considerable care has been taken to estimate the net benefit for each segment. In a cost benefit analysis, a net benefit estimate is arrived at by deducting the cost of all inputs, including “international and interregional imports” as well as “local inputs”, to estimate the net benefits. Some costs and benefits can be estimated with reasonable certainty. However, as the CBA report discusses in some detail, there is limited data available to estimate the incremental net benefits from additional visitor expenditure (the 4<sup>th</sup> segment of benefit listed in table 1). The economic theory and available data applying to our estimate of net benefit from additional visitor expenditure is discussed in section 1.4.1 and appendix 3 of the CBA report.

The data uncertainty is recognized in the CBA by presenting a wide range of sensitivity analysis. For the “low” scenario, this sensitivity analysis shows the impact on the aggregate net benefits if the incremental benefit (that is, the benefit after deducting all input costs, including ‘international and interregional imports’ as well as local inputs) from each \$1 spent by a visitor arriving by plane is just 10 cents. The “high scenario” considers the impact on aggregate net benefits if the incremental benefit from each \$1 spent is 80 cents. No commentator on the draft CBA report suggested that the net incremental benefit would lie outside this range. To place this range of estimates in context, Market Economics estimated that the regional value add from each \$1 spent by a visitor arriving on a cruise ship amounted to \$1.44 (after excluding international and interregional imports).<sup>4</sup>

- Some cost items (to businesses) are captured as benefits (e.g. salaries and wages as well as consumption of fixed capital). Costs to business are not captured as benefits, as should be clear by referencing section 1.4.1 of the CBA report and appendix 3 of the CBA.
- The total freight movements appear very high when compared to historic export/imports through Wellington. Our assumptions for freight volumes align with those adopted by EY in its *Economic impact of the proposed runway extension* report. In its review of the EY report, NZIER concluded (in an otherwise critical review) that the approach used for freight volumes was “fit for purpose”. There are good reasons for viewing the freight assumptions in the CBA as conservative (e.g., a comparison

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<sup>4</sup> As noted above, an analysis of ‘value add’ as undertaken by Market Economics is likely to exaggerate the effects of an activity on economic wellbeing.

of high value consumption in the Wellington region – and hence demand for airfreight - relative to current airfreight capacity suggests a substantial ‘freight gap’).

In any event, the freight numbers are largely immaterial to the estimated net benefit from the runway extension – the net benefits from additional airfreight contribute less than 0.1% of the estimated net benefit.

### **With reference to the economic impact component**

- The EIA component looks at three reports from which Sapere derives impact ratios. The Martin Jenkins report and the Cruise NZ reports are for different sectors so it is not appropriate to use either of these. The EY report is unclear as to what sort (output or value added) of multipliers are used. It is also unclear what type of multipliers have been derived (Type 1: direct and indirect or Type 2 direct, indirect and induced; and multiregional or single region). It is not possible to use the EY multipliers without knowing what sort of multiplier(s) they represent.

The three reports referred to in our response to the GWRC letter of 16 June all estimate the value add (addition to regional GDP) as a result of additional expenditure in the Wellington region. From comparing the estimate of additional expenditure and the estimate of value added from each report, we show that:

- The Market Economics report estimated that each \$1 spent by a visitor to Wellington arriving on a ship results in \$1.44 in regional GDP
- The EY report estimated that each \$1 spent by a visitor to Wellington arriving on a plane results in \$1.42 in regional GDP
- The Martin Jenkins report estimated that each \$1 spent in the arts and culture sector in Wellington results in \$0.77 in regional GDP.

Applying these ratios to the additional expenditure in the Wellington region as a result of the extension to the runway, produces estimates of value add (regional GDP) of between \$0.8 billion (the Martin Jenkins ratio) to \$1.4 billion (the Market Economics and EY ratios) in present value terms. These values contrast with the capital cost of the runway extension of about \$300 million (in present value terms).

There will be some differences in the expenditure profile of a visitor arriving on a ship from a visitor arriving on a plane – for example, a visitor on a ship is less likely to spend money on hotel accommodation. These differences can reasonably be expected to have only a minor effect on an estimate of economic activity resulting from additional expenditure by visitors. There would be no basis, for instance, to think that a contribution to regional GDP from a dollar spent in Wellington by a visitor arriving on a plane would be only 20% of the contribution to regional GDP from a dollar spent in Wellington by a visitor arriving on a ship – a result that would be necessary to reduce the estimated value add to the Wellington region to approximately the same amount as the cost of construction (assuming the full cost of construction was borne within the Wellington region, which would be a bold assumption).

Given the extent to which expected value add exceeds the costs, a discussion about types of multipliers which lie behind the Market Economics, EY, and Martin Jenkins studies would have

no material impact on the conclusions. If the estimated value add is close to the estimate of cost, there might be a reason to consider the comparative contribution of input suppliers (type I multipliers) and the induced effects from higher incomes (type II multipliers). However, these technicalities would not materially alter the conclusions that the runway extension can be expected to add, annually, to the Wellington regional economy:

- 10 to 19 times the annual value contributed by the World of Wearable Arts event
  - 2 to 4 times the annual value contributed by visits from cruise liners to Wellington
  - About quarter of the entire arts and culture sector in Wellington.
- The economic impact component does not reflect or report on the employment effects and/or the income effects.

Correct. This query highlights why economic impact assessments (measures of activity) are a poor indicator of the effects of a proposal on economic well-being. People work to improve their well-being. An increase in employment (more hours worked) does not necessarily mean an improvement in well-being or provide insights for the use of society's scarce resources, as illustrated by the New Zealand Treasury's example of employing someone to dig a hole and fill it in again. In an economic assessment of well-being, an increase in employment/hours worked, is a cost, not a benefit, to society.

- The construction effects are not included in the assessment

Not correct. We repeat the text from our response to the GWRC letter of 16 June:<sup>5</sup>

“The increase in direct expenditure as a result of the airport expansion would include:

- the increase in spending from the additional visitors to New Zealand; as discussed above, the CBA estimates that 31% of the additional expenditure would be spent in the Wellington region, or \$683 million. This estimate would vary with the low and high forecasts for passenger movements, to range \$237 to \$817 million
- the direct cost of building/constructing the runway extension and the provision of code E gates - \$306 million (range \$301 – \$308 million).

Hence, the total increase in direct expenditure in the Wellington region as a result of the runway extension would amount to around \$1.0 billion (range \$0.5 - \$1.1 billion)...

Within the limits of input-output analysis, there is reason to consider the results shown in table 4 as conservative as it applies the same multiplier to visitor expenditure and to construction expenditure. A relatively recent report estimates that the output multiplier associated with construction activity is three; that is, a dollar of additional expenditure in the construction sector generates an additional two dollars of expenditure elsewhere in the economy.”

- The effects of how the extension is financed (general taxation or other) are not included
- Not correct. The net benefit estimates detailed in the CBA report provide for the economic costs of alternative means of funding. Alternative methods of funding may impact on either the

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<sup>5</sup> Attachment 2, pages 4 – 5.

economic cost of the project or the economic benefits obtained from the project or both the cost and the benefit.

The CBA calculates and shows the addition to the cost of the project, if the project were to be funded by tax (by central or local government). This cost of \$61.1 million was set out in table 2 of our response to the GWRC letter of 16 June. This estimate follows the approach recommended by the New Zealand Treasury for recognizing the costs to society of raising funds through taxation (that is, adding a further 20% to the cost of funding in addition to the cost of capital). This calculation is discussed in chapter 7 of the CBA report, and the economic cost of taxation is added as a cost to the cost of extending the runway.

Alternative sources of funding (e.g., landing charges) could reduce or avoid these 'deadweight costs'. For instance, if the entire project is funded without use of tax revenue, the CBA would have over-estimated the *cost* of the project by \$61.1 million.

However, an alternative source of funding, for example from landing charges, might impact on the potential *benefits* from the project. This would occur if the landing charges were designed in a manner such that they impacted on the forecast number of passenger and plane movements.

The analysis presented in the CBA report considers a wide range of forecast passenger and plane movements, down to the 5<sup>th</sup> percentile (that is, there is less than a 5 per cent chance that traffic at Wellington will drop below the low scenario forecast), and up to the 95<sup>th</sup> percentile (that is, there is a 5% chance that traffic at Wellington would be above the high forecast). Hence, the CBA presented the impact on net benefits from all impacts on forecast passenger and plane movement, including the impact of possible forms of landing charges, between the 5<sup>th</sup> and 95<sup>th</sup> percentiles. The results show that the runway would still produce a net benefit at the 5<sup>th</sup> percentile forecast (see Table 33 of the CBA report). Between the 5<sup>th</sup> and 95<sup>th</sup> percentile forecasts there will be many plausible landing charges regimes that contribute significantly to the funding options (the potential sources).

The only funding scenarios not modeled and presented in the CBA report would be those that assume Wellington International Airport would proceed with the project, and adopt a funding approach which it expects to reduce forecast passenger and plane movements below the 5<sup>th</sup> percentile forecast. Such a scenario would be implausible and commercially unrealistic.

Kieran Murray  
25 August 2016