Before an Independent Hearing Panel
Appointed by Wellington City Council

In the Matter	of the Resource Management Act 1991
And	
In the Matter	of a Notice of Requirement to designate land for Airport Purposes known as the East Side Area NOR.

Statement of Evidence of **Iain Munro** for Wellington International Airport Ltd

Dated: 5 May 2021

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INTRODUCTION

Qualifications and Experience

1. My name is Iain Munro. I am General Manager New Zealand/Pacific for Airbiz Aviation Strategies Limited ("**Airbiz**"), a position I have held since 2001. Airbiz is a specialist consultancy group with offices located in New Zealand, Australia, Canada and the UK that advises on the planning, safeguarding, design and development of airports, terminal buildings and aviation facilities, and the business of airports.

2. My professional qualifications are Bachelor of Engineering (Honours) (Civil) and Master of Engineering (Civil). Both degrees were awarded by Canterbury University in Christchurch, in 1974 and 1976 respectively.

3. I have also undertaken specialist airport planning training through an Airport Planning Procedures Course at Loughborough University in the UK.

4. In a 47 year professional career, I have been involved for approximately 35 years in the aviation industry providing strategic and business advice to airports and airlines, undertaking master planning and project planning of airport infrastructure and terminal facilities for airports, and for a period in the management of airport operations for two New Zealand airlines.

5. I have been involved with provision of planning advice at numerous airports in New Zealand, Australia, the Pacific, Canada, USA, United Kingdom, South Africa, Japan, India, Singapore, Hong Kong, Malaysia and the Philippines. As a result, my experience includes a deep understanding of business, planning, safety and operational issues at domestic and international airports, locally and globally.

6. I have been involved with Wellington Airport, either as an airline operations manager, or as a specialist aviation planning adviser, for a period of more than 30 years, including extensive participation in numerous Wellington Airport projects and studies, providing knowledge and experience about airline and airport operations, and planning and development for airport infrastructure.

Code of Conduct Statement

7. While this is not an Environment Court hearing, I nonetheless confirm that I have read the Code of Conduct for Expert Witnesses issued as part of the Environment Court Practice Notes. I agree to comply with the Code and am satisfied that the matters which I address in my evidence are within my field of expertise. I am not aware of any material facts that I have omitted which might alter or detract from the opinions I express in my evidence. I understand that I have an overriding duty to assist the hearing in an impartial manner and that I am not an advocate for the party which has engaged me.

Scope of Evidence

8. I have been asked by WIAL to provide evidence with respect to aviation planning advice that Airbiz has contributed to master planning at Wellington Airport including the 2040 Airport Masterplan, and the key regulatory and dimensional drivers that have influenced the location and extent of land required for the East Side Area NOR.

9. In preparing this evidence, I have reviewed the following (in so far as they are relevant to my area of expertise):

    (a) The East Side Area NOR and associated Assessment of Environmental Effects ("**AEE**") documents;

    (b) All further information provided by WIAL in response to requests issued by Council for the East Side Area NOR;

    (c) The reports and statements of evidence of all the other witnesses giving evidence on behalf of WIAL;

    (d) The section 42A report prepared by Mr Ashby for Wellington City Council; and

    (e) Submissions.

10. My evidence includes:

    (a) Benchmarking of Wellington Airport's spatial area with other NZ airports;

    (b) The purpose of and approaches to airport master planning;

(c) The history of master planning at Wellington Airport;

(d) Drivers of area requirements for master planning, including for aeronautical uses on the East Side area, including air travel demand, spatial parameters, and regulatory compliance;

(e) Configuration of aeronautical infrastructure on the East Side Area;

(f) Consideration of alternative solutions;

(g) Discussion about the effects of Covid-19 on the Masterplan; and

(h) Responses to submissions.

EVIDENCE

Benchmarking with other airports

11. Wellington Airport is one of three airports in New Zealand that are often referred to as the main trunk airports. These are the three airports which Air New Zealand uses as domestic network hubs where all of their domestic flights arrive or depart. In 2019:

(a) Wellington Airport handled 6.4 million passengers[1] in total, 5.4 million of which were domestic passengers.

(b) Auckland Airport handled 21 million passengers in total, 9.5 million of which were domestic passengers.

(c) Christchurch Airport handled 6.9 million passengers in total, 5.1 million of which were domestic passengers.

12. The land footprint (existing site 110 hectares) of Wellington Airport has been overlaid on the land of Auckland (1500 hectares) and Christchurch Airport (1000 hectares). These drawings can be found in **Annexure A** appended to this statement.

13. It can be seen in these drawings that Wellington Airport operates on a much more constrained site than Auckland and Christchurch Airports. While Wellington Airport's operations have highly efficient land utilisation relative to

[1] In this context counting the number of passengers, a passenger is either a departing, an arriving or a transiting traveller, including both domestic and international travellers.

peer airports in New Zealand and Australia there is only so much that can be achieved in such a constrained area while providing for growth and efficient operations as discussed below.

14. Obviously, Auckland Airport has a substantially larger site and much greater passenger traffic throughput as a consequence of being the principal international gateway and serving a larger metropolitan area and catchment. However, Christchurch has a similar level of passenger traffic compared with Wellington, but has a much larger airport site, almost nine times larger than Wellington's.

15. As a consequence of its significant land area constraints, Wellington Airport has always sought to achieve the most efficient possible use of its scarce land resource, for aeronautical facilities and activities, public access and services and commercial undertakings. In the course of this WIAL has consistently undertaken its master planning work in more detail than many other airports with large landholdings, aiming to achieve the most intensive possible utilisation of resources.

16. The spatial land requirements for the majority of activities and facilities at the airport are mainly non-discretionary, either needing to be sized to provide appropriate levels of services to the numbers of passengers, employees, visitors and vehicles concurrently on the site, or to comply with regulated safety requirements for the manoeuvring, parking and servicing of aircraft.

17. There are no substantial areas of Wellington Airport land that are not currently developed or are not allocated for development as part the Airport's Masterplan. Accordingly, Wellington Airport needs to expand its land area outside its current site boundary, to be able to meet future growth in demand and in doing so provide efficient, future proofed infrastructure.

Airport Master Planning

18. A major aspect of successfully maintaining and operating an airport is having a robust long term land use and development strategy. In my experience, best practice is that such a strategy should include a master plan for the airport, which should be a forward-looking guide to the way that land is developed or redeveloped to meet the needs of those that use the airport. Master plans often include provisions which protect or indicate land for future airport

development and operations, and incorporate ways in which the effects of airport use on those that reside within surrounding communities can best be managed.

19. The International Civil Aviation Organisation (**"ICAO"**) states[2] that:

> "*Airport planning is the evolution of a compromise between the conflicting features of the best plan for each of the individual facilities. The essential degree of precision and balance in the overall plan varies with the scale of activity which the airport is intended to support. As the rate of aircraft, vehicle and passenger movements increases it becomes more necessary for airport plans to be the optimum compromise, so that the planning of all the individual facilities contributes and combines into the most efficient total plan and provides the greatest degree of flexibility and expansibility for future development*."

20. In this light an airport master plans should guide:

    (a) The efficient and effective use of resources (e.g. infrastructure, land) and capital investment;

    (b) Built form that responds to environmental conditions, avoids (as far as can be achieved) reverse sensitivity and suitably manages risk from issues such as climate change for example;

    (c) The optimum and timely provision of infrastructure, facilities, both aeronautical and commercial, including accommodating and capitalising on future demand; and

    (d) The quality of buildings and spaces and how these come together with activities to create unique and attractive places.

21. Airport master plans usually cover a wide range of spatial scales and timescales that often span over decades. In my experience, successful master plans are prepared in consultation with key stakeholders, including the communities that occupy the spaces around airports. Airport master plans

2 ICAO Doc 9184, Airport Planning Manual, Part 1 Master Planning.

generally define future land use locations at a broad scale and tend to leave the detail about individual buildings and spaces to those who will design them at some later stage.

22. Reservation of land for future needs and uses is particularly important at airports because:

    (a) Land needs for aircraft operations and efficient processing of passengers and freight are significant;

    (b) Stringent safety requirements must be adhered to meet the standards set by the Civil Aviation Authority of New Zealand (**"CAANZ"**), such as provisioning for safe clearance distances between aircraft for example;

    (c) The diverse nature of airport operations means that allocation of land for particular uses must be undertaken carefully to ensure operational and environmental compatibility both within an airport and outside the airport;

    (d) The aviation industry is recognised as having relatively high long term growth characteristics and it is critical to take a long-term view when planning for likely infrastructure and development needs; and

    (e) In most cases it is simply implausible to replicate airport facilities in a given location and long term protection of land around existing airports is important to provide for future aviation demands.

23. Many of the world's major airports suffer from lack of adequate reservation of surrounding land and appropriate land use planning. Almost without exception, this results in constraints on development, reduced operational flexibility and capacity, and also environmental problems which can hamper the economic well-being and quality of life of the community served by the airport. Airports have become increasingly important to cities such as Wellington for the role that they play in facilitating broad social, economic and cultural benefits which accrue to a wide sector of the community and master planning for the future is an essential management tool.

24. In Australia, the United States and Canada there are statutory requirements covering the frequency and format for updating and publishing major airport

master plans. This is typically required at five year intervals. The same requirements are not included in New Zealand legislation but well-managed airports, such as Wellington, recognise the critical importance of doing so and regularly update part or all of their overall master plans.

Master Planning at Wellington Airport

25. Airbiz has provided airport master planning advice to Wellington International Airport Limited ("**WIAL**") since 1991. Since that time Airbiz has completed over 160 Wellington Airport planning projects.

26. WIAL has prepared and published Masterplans for Wellington Airport in 1991, 2010 and 2019 which were publicly released. In the interim periods between these Masterplans, WIAL has regularly undertaken extensive internal master planning studies to further investigate more specific areas with the Airport campus, such as the terminal precinct, forecourt, car parking, airfield regulatory compliance, and overall land use. While these additional studies have not released as formal master plans, they have all contributed significantly to the more formal planning processes. Airbiz has been the primary aviation adviser to WIAL for all these Masterplans.

27. WIAL released the 2040 Masterplan publicly in October 2019 just prior to the pandemic – it is the current Airport Masterplan. The Masterplan focuses on development of the airfield and terminal in order to increase capacity up to 12 million passengers per annum (**MPPA**). The development anticipates moving international operations to a new terminal at the southern end of the existing terminal, and long-term expansion of apron areas east, into land currently occupied by the Miramar Golf Course but now owned by WIAL.

28. Airport site plans depicting the overall layout of the Airport from the each of these Masterplans are shown at **Annexure B** appended to this statement.

29. Despite being prepared at various times over a nearly 30 year period, each of the three Masterplans depicts a consistent long-term airport development configuration, including:

    (a) A single runway;

    (b) A single parallel taxiway providing access to each end of the runway;

(c) The passenger terminal precinct on the eastern side of the runway;

(d) Aircraft parking aprons[3] and aviation support services located on the eastern side of the runway generally to the south of the passenger terminal; and

(e) General Aviation (GA), military and commercial uses on the pocket of land on the western side of the runway.

30. The Masterplan prepared in 1991 worked to a 20 year planning horizon of 2011 and a central throughput demand forecast at 2011 of 5 million annual passengers.

31. The Masterplan prepared in 2010 worked to a 20 year planning horizon of 2030 and a central throughput demand forecast at 2030 of 10 million annual passengers.

32. The 2040 Masterplan prepared in 2019 also worked to a 20 year planning horizon of 2040 to cater for a throughput capacity of 12 million annual passengers.

33. For comparison purposes the actual passenger throughput numbers at Wellington Airport have been:

(a) 1991: 2.4 million

(b) 2011: 5.1 million

(c) 2019: 6.4 million (pre-Covid).

Drivers of Area Requirements for Master Planning

34. The primary drivers for establishing area requirements for airport master planning, and of relevance to this hearing, the need to utilise the East Side Area, are:

(a) The time period for which future planning is being undertaken, known as the planning horizon – in this case 2040 which was

[3] Apron - Means that part of an airport, other than the manoeuvring area intended to accommodate the loading and unloading of passengers and cargo, the refueling, servicing, maintenance and parking of aircraft.

approximately 20 years from the time when the Masterplan was completed;

(b) The anticipated overall level of aviation activity to be catered for at that planning horizon, known as the annual traffic forecast – in this case a central throughput demand forecast at approximately 2040 of 12 million passengers per annum (**MPPA**);

(c) The anticipated level of aviation activity to be catered for at that planning horizon, during a typical busy period, during which a practical maximum number of aircraft will be required to be catered for on the runway and aircraft parking aprons, and a practical maximum number of passengers will be needing to process through the passenger terminal facilities;

(d) The amount of space that is required to be provided at that planning horizon at suitable locations to cater for:

(i) Infrastructure for the movement, parking and servicing of the expected practical maximum concurrent number of aircraft;

(ii) Terminal facilities for the processing, dwell time and catering for the expected practical maximum concurrent number of passengers, friends, employees;

(iii) Related facilities such as car parking, vehicle pick-up and drop-off, road access, rescue and fire-fighting, airport maintenance and operations, etc.; and

(iv) Air traffic control and navigational aids for the safe and efficient operations of aircraft approaching and departing from the airport.

35. Airbiz provided the specialist skills and experience as Airport and Terminal Planners, to quantify the many diverse metrics that together aggregate to quantify the master planning area requirements, and to then prepare the most efficient layout for the future configuration of the Airport that is depicted in the Masterplan drawing.

36. For the current Masterplan Airbiz:

(a) Established with WIAL that the planning horizon would be 20 years to 2040.

(b) Adopted the central forecast of 12 MPPA, without a runway extension, that had been prepared for WIAL by another specialist consulting firm InterVISTAS[4];

(c) Assessed the most likely future aircraft fleet mix considering aircraft types expected to be manufactured, the types appropriate for Wellington's air route network (short haul Tasman/Pacific, domestic main trunk and domestic regional) and expected aircraft selections by the main airlines operating at the airport;

(d) Translated the 12 MPPA annual passenger throughput demand level into a practical busy hour demand level to quantify numbers of concurrent aircraft and passengers[5];

(e) Assessed the spatial and locational requirements necessary to handle the expected numbers of aircraft and passengers in the 12 MPPA busy period by applying industry-recognised parameters (such as space per busy hour passenger and space per busy hour aircraft) to the projected busy hour demand levels – see below for further explanation; and

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[4] InterVISTAS prepared six annual forecasts for WIAL representing different scenarios. The six scenarios were made up of three growth scenarios each for two runway scenarios. The two runway scenarios were Runway Extension and Business as Usual (no runway extension). The three growth scenarios were Conservative, Most Likely and Optimistic.

On the instruction of WIAL, the Business as Usual (no runway extension) Most Likely annual forecast was adopted for facility requirement planning for the Airport Masterplan. This was 12 million annual passengers.

[5] The trend of the numeric ratio between busy hour and annual passenger numbers was analysed from actual data for a recent (5 year) period of time and then was projected forward to the 2040 planning horizon, with a progressively reducing trend into the future, accounting for the tendency for annual passenger growth to be faster than busy hour passenger growth through the various mechanisms of peak spreading. The projected ratio between busy hour passengers and annual passengers was multiplied by future forecast annual passengers to calculate future busy hour passengers.

The future numbers of concurrent aircraft to be handled and parked during the busy period was derived from the assessment of busy hour passengers by considering the expected future aircraft fleet mix likely to be operating at the airport and the average aircraft size in the future and the expected numbers of passengers embarking and disembarking on each aircraft.

(f) Prepared the most efficient layout for the future configuration of the Airport to meet the 12 MPPA requirements that is depicted in the Masterplan drawing.

37. In consideration of the above, the master planning work determined that the spatial area and locational requirements for the future 12 MPPA airport capacity would need to be met with a Masterplan layout that extends on to the East Side Area land.

Projected Busy Period Passenger and Aircraft Demand

38. The approach to quantifying the anticipated level of aviation activity to be catered for at the 12 MPPA planning horizon, during a typical busy period, has been described above. Although this encompasses both passenger and aircraft metrics, the requirement that forms the primary basis for the proposed land use within the East Side Area is the forecast aircraft parking stand demand.

39. The outcome of the aircraft stand demand analysis results in the following concurrent aircraft parking requirements for 12 MPPA:

Aircraft Code	Examples	Role/Routes	No. Stands
C (turboprop)	ATR72, Q300	Domestic Regional	14
C (jet)	A320, A321, B737	Domestic Trunk International Shorthaul	12
E	B787, A350	Domestic Trunk International Shorthaul & Longhaul	5

40. Sufficient aircraft parking capacity is depicted in the Masterplan to meet this demand, extending from the northern end of the passenger terminal facility along the western perimeter of the existing terminal building including the Northwest and Southwest piers, and then around the circumference of the future southern pier towards the East Side Area to the extent shown in the Terminal Precinct and East Side Area Layout drawing at **Annexure B**.

41. Larger aircraft up to Code E size will be progressively accommodated in the south around the new pier, although the parking stands for these will be versatile multi-use (MARS) stands whereby 2 smaller Code C aircraft can be accommodated in the space for one larger Code E aircraft.

Parameters for Spatial Requirements

42. There are a number of sources for spatial parameters that are applied to the projected numbers of concurrent busy period passengers and aircraft in the course of the master planning process.

43. Terminal and passenger related parameters which are applied to size future terminal building and related facilities are principally sourced from industry and real-life experience and are more subjective, with guidance from the International Air Transport Association (**"IATA"**)[6], local and global expectations of quality of level of service (i.e perceptions of spaciousness). For example, international terminal facilities tend to require more space than domestic facilities, per passenger, because international processing is more complicated and international passengers generally dwell longer in the terminal.

Regulatory compliance

44. On the other hand, aircraft movement and parking spatial requirements are much more regulated and prescribed, primarily for safety reasons.

45. Of relevance to the spatial requirements that have had the most influence on the need for aviation activities on the East Side Area (the subject of this NOR) are the prescribed set-out, separation and clearance distances associated with several airfield elements including the runway strip[7], full length parallel taxiway, taxilanes and aircraft parking stands.

46. ICAO is the agency of the United Nations responsible for rules, standards, planning and development of international air transport globally to ensure safe and orderly growth. New Zealand is a signatory to the treaty[8] that established ICAO in 1944.

[6] IATA Airport Development Reference Manual, 11th Edition, 2019.

[7] A runway strip is a defined graded area surrounding and including the runway, intended to reduce the risk of damage to aircraft running off a runway; and to protect aircraft flying over it during take-off or landing operations.

[8] The Convention on International Civil Aviation, also known as the Chicago Convention, established the International Civil Aviation Organization (**ICAO**).

47. The Civil Aviation Authority of New Zealand ("**CAANZ**") is the government agency tasked with establishing civil aviation safety and security standards in New Zealand under the Civil Aviation Act 1990.

48. International standards and practices applicable to aerodrome set-out are contained in the ICAO document *Annex 14, Volume 1 Aerodrome Design and Operations*.

49. New Zealand standards for aerodromes the size of Wellington are defined in two documents promulgated by CAANZ:

    (a) Civil Aviation Rule Part 139, Aerodromes Certification, Operation and Use; and

    (b) The associated Advisory Circular AC139-6, Aerodrome Design Requirements for All Aeroplanes Conducting Air Transport Operations and All Aeroplanes above 5,700kg Maximum Certified Take-off Weight.

50. Wherever possible, states including New Zealand are obliged to comply with ICAO rules, standards and practices. However, differences have in the past and still do exist between ICAO and local (New Zealand) standards and practices, generally arising from particular local circumstances.

51. When Wellington Airport was designed and subsequently commissioned in 1959 on the present isthmus of land in Rongotai, the scarcity of available land on the site, the then intended domestic role for the airport and the expectations at that time of much smaller aircraft types influenced decisions about the airfield set-out. One of the tightest constraints was the narrowness of the land at the northern end of the runway, bounded and constrained by Rongotai residential development on the western side (Bridge Street) and the main access road to the Airport on the eastern side (Calabar Road).

52. Under definitions outlined in ICAO Annex 14 Volume 1 and AC139-6 the classification of the runway at Wellington Airport is an Instrument Non-Precision Approach Runway[9] serving up to Code E size aircraft.

[9] An Instrument Non-precision approach runway is a runway served by visual aids and a non-visual aid(s) intended for landing operations following an instrument approach operation type A and a visibility not less than 1000m.

53. For many decades, CAANZ has maintained specifications for runway strip width and for this particular category of runway, (Instrument Non-Precision), that are significantly different to ICAO requirements, specifically in recognition of the spatial constraints applying at Wellington Airport and several other airports in New Zealand and to support a framework for continuing local regulatory compliance for Wellington Airport. CAANZ requirements for Instrument Non-Precision are runway strip width (150m) and runway-taxiway separation (182.5m), whereas ICAO requirements are runway strip width (280m) and runway-taxiway separation (172.5m).

54. Further, it is possible in future that the Wellington Airport's runway category could become Instrument Precision[10] if procedures were changed to reduce the missed approach decision height from 300ft to 250ft. CAANZ requirements for Instrument Precision runways are runway strip width 300m and runway-taxiway separation for Code E aircraft 182.5m.

55. In 2018, ICAO promulgated small reductions in metrics for, inter alia, these set-out dimensions for runway strip and runway-taxiway separation, as depicted in the table at paragraph 59 below[11]. Many national regulatory agencies (including Australia) have subsequently followed the ICAO requirements and adjusted their state-level metrics to align with ICAO. There is an expectation in the aviation industry that CAANZ will in the near future follow suit and also reduce these dimensions for both Instrument Precision runways to match ICAO's for Instrument runways.

56. As a result, the actual dimensional set-outs at Wellington Airport for the runway strip width (150m) and runway-taxiway separation (107.5m[12]) are significantly less than and are not compliant with today's requirements under ICAO and CAANZ respectively.

[10] An Instrument Precision approach runway, category I is a runway served by visual aids and non-visual aid(s) intended for landing operations following an instrument approach operation type B with a decision height (DH) not lower than 60 m (200 ft) and either a visibility not less than 800 m or a runway visual range not less than 550 m.

[11] Until 2018, the ICAO and CAANZ metrics in the table above were actually the same for runway-taxiway separation and for Precision Runway strip width (although still different for Non-Precision Runway strip width). In 2018, ICAO promulgated reduced requirements for runway strip width and runway-taxiway separation. To date, CAANZ has not indicated whether it might also reduce its requirements for these dimensions.

[12] The taxiway was originally constructed at up to106.7m separation from the runway but was modified in 2018 to be aligned at 107.5m.

57. There is also no guarantee that CAANZ will always retain its reduced dimension for Instrument Non-Precision runway strip width, possibly aligning to the larger ICAO requirements for Instrument runways.

58. In the meantime, WIAL continues to allow for the somewhat larger CAANZ set-out dimensions (for a Precision approach) while having a reasonable degree of expectation that CAANZ will reduce these in the near to medium future. I will explain how WIAL has allowed for these possible regulatory eventualities when discussing the Masterplan set-out.

	ICAO	CAANZ	Actual at Wellington Airport
Instrument Precision Runways			
Runway strip width	280m	300m	150m
Runway to Taxiway Alpha separation	172.5m	182.5m	107.5m
Taxiway Alpha to Taxiway Bravo separation	76.0m	76.0m	ranges 63-67m
Instrument Non-Precision Runways			
Runway strip width	280m	**150m**	150m
Runway to Taxiway Alpha separation	172.5m	**182.5m**	107.5m
Taxiway Alpha to Taxiway Bravo separation	76.0m	76.0m	ranges 63-67m

59. The continuing issue is, therefore, that Wellington Airport's runway does not comply with either ICAO or CAANZ requirements for its category of use.

60. To address this issue, WIAL and CAANZ, together with airlines using the Airport, have undertaken various aeronautical studies to establish the safety of continuing operations under this constrained airfield configuration[13].

[13] 2006: CAANZ exemption to allow for the continued operation of precision approaches by Code 3 and 4 aircraft at Wellington and to permit a reduction in the Instrument Landing System (ILS) landing minima, thereby reducing disruptions due to poor weather.

2008: CAANZ acceptance of a submission from WIAL concerning the reduced runway-taxiway separation based upon the establishment of listed operational limitations to manage the non-conformance.

2015: WIAL to ensure, as far as practicable, that a full 300m fly over strip remains free of fixed obstacles in support of the currently published CAT 1 ILS landing minima.

2016: CAANZ acceptance of WIAL proposal confirming that the lower runway-taxiway separation distance is permissible as it does not adversely affect safety or significantly affect regularity of operations.

2018: CAANZ acceptance of WIAL aeronautical study removing restrictions on Code D or E aircraft operating on Taxiway A when a Code E aircraft is on the runway at any time.

61. However, WIAL is cognisant that CAANZ may, in the future, endeavour to resolve and remove some of the differences between the actual airport configuration and ICAO/CAANZ prescriptions, moving in the direction of increasing international compliance with ICAO. Accordingly, where possible, WIAL strives to comply with, or protect for future compliance with ICAO requirements.

62. It may be highly challenging to ever have to increase the runway strip width from 150m to 280m and the entire runway-taxiway separation from 107.5m to 172.5m, as these would likely involve substantial impacts on residential areas in Rongotai and Miramar South and necessitate the displacement of the main Calabar Road access way. However, the planning underpinning the Masterplan provides for the runway-taxiway separation change to be progressively provided in the future, as and if required by CAANZ, in the areas where it would be feasible to do so which broadly extends across the extent of the passenger terminal precinct, and southwards to the southern end of the runway.

63. However, it is conceivable (and has occurred in the past i.e. from 2008 to 2018 for Code E use) that more restrictive operational conditions could be imposed on the use of Taxiway Alpha, effectively making it much less effectual for its primary purpose which is to provide access for aircraft to and from each end of the runway.

64. To protect against this possible eventuality, the current Masterplan provides for the second taxiway, Taxiway Bravo, to eventually serve as the primary taxiway across the frontage of the passenger terminal precinct in the event that Taxiway Alpha is restricted from fulfilling such a role. Taxiway Bravo alignment currently varies along its length. With works planned by WIAL to be carried out in the next 2 to 3 years, Taxiway Bravo will be aligned to be compliant with ICAO requirements, and with future likely CAANZ requirements), at either:

    (a) 172.5m from the runway centreline (at the frontage with the existing terminal), or

(b) 183.5m (across the frontage with the southern extension to the terminal, being the aggregate of the Taxiway Alpha separation from the runway 107.5m and the Taxiway Bravo separation from Alpha 76.0m). This latter spacing is depicted in the drawing at **Annexure C.**

65. Further, the Masterplan then provides for an additional segment of taxilane, set at a further 76.0m east from Taxiway Bravo (not yet named but probably to be called Taxiway Charlie) to facilitate aircraft entering and leaving parking stands on the western side of the new pier, without conflict to aircraft on Taxiway Bravo.

66. A further aviation safety control measure that needs to be provided for is the Obstacle Limitation Surface (**"OLS"**). Obstacle Limitation Surfaces (**OLS**)[14] serve to protect the manoeuvring areas required by aircraft whilst operating on and over an aerodrome's runway(s). The Transitional Side Surfaces which are lateral sloping surfaces forming the part of the OLS surfaces which typically limit the allowable obstacle heights (i.e the passenger terminal, parked aircraft, floodlighting etc.) adjacent to the runway alignment, originate from the edge of the runway strip. The graphic at **Annexure D** shows the diagrammatic configuration of a runway strip and OLS.

67. The current Transitional Side Surfaces emanate from the side edges of the 150m wide runway strip and the heights of the terminal building and tail fins of aircraft parked at the terminal are limited by these controls. However, if CAANZ were, in future, to require compliance to a wider runway strip at Wellington Airport, either 300m (CAANZ) or 280m (ICAO), then the Transitional Side Surfaces would need to emanate from a line further east than current, 65.0m further east (ICAO). If this regulatory requirement is implemented, a number of the western-most aircraft gates at the passenger terminal would be affected by the eastward shift of the OLS, such that aircraft tails would infringe the OLS.

68. Anticipating this future compliance requirement, WIAL has required that the new aircraft stands proposed to be constructed on the western side of the new

[14] Obstacle Limitation Surfaces are complex imaginary surfaces that define areas about and above an aerodrome intended to control the location and height of obstacles for the protection of aircraft operating in the vicinity of an aerodrome.

South Pier are positioned sufficiently far east so that higher aircraft tails (such as Boeing 777 or 787) will not infringe the OLS.

69. Additionally, recently built structures in the Western Precinct, the new Air Traffic Control Tower and the Execujet hangar, have been positioned such that they buildings comply with the OLS based on the 300m runway strip requirement.

70. The graphics at **Annexure E** depicts the geometric relationships (in cross-section view) of the runway, taxiways, aircraft parking stands, existing buildings (terminal, hotel, car park) and future terminal pier building envelope positioned sufficiently eastwards to not infringe the OLS.

Locational Requirements

71. In addition to the spatial and regulatory requirements that drive the airport configuration, there are also locational requirements and constraints that influence where certain components of infrastructure can and cannot be positioned on the airport.

72. Three examples not covered in the previous and following sections of my statement are:

(a) Air Traffic Control Tower: this facility needs to be in a location that provides clear visibility and sight line for controllers to see the approaches to and physical ends of the runway, all sections of taxiways, and where possible as much of the aircraft parking aprons as possible. The Wellington Airport Tower is located in the Western precinct;

(b) Rescue and Fire-fighting services: this facility needs to be located with direct access to the runway and taxiways in a reasonably central location to enable rapid access (within prescribed time limits) to all locations on the airfield. Currently this facility is located at the northern end of the terminal precinct; and

(c) Navigation aids: the airport requires land located near the ends of the runway (both ends) but sufficiently clear in a lateral direction to provide the instrument landing system equipment that guides aircraft and pilots on the correct safe approach paths to the runway

end when landing. Currently the equipment for the instrument landing system is located at the north-western end of the runway on very constrained land due the close adjacency of Bridge Street, and at the southern end, constrained my Moa Point Road. However, neither of these sites will be sufficient in area to accommodate future navigational aid technologies. The Masterplan therefore identifies and reserves airport land on the top of the Wexford Road ridge at the north-eastern end of the runway for future installation of equipment for a Ground Based Augmentation System (**GBAS**), which will require site area, subject to design, in the order of 15,000 to 20,000 m^2. When implemented, GBAS will augment the existing Global Positioning System (**GPS**) used in airspace navigation by providing corrections to aircraft in the vicinity of the airport to improve the accuracy and reliability of aircraft GPS navigational positioning. The goal of GBAS implementation is to provide an alternative to the Instrument Landing System (**ILS**) supporting the full range of approach and landing operations.

Geometric Set-out of East Side Area

73. A report prepared by Airbiz in support of the East Side Area NOR titled "*Wellington Airport Notice of Requirement Input Airport Master Planning Setout"* provides the basis of the easterly and southerly geometric set-out for the East Side Area and can be found in **Annexure F** appended to this statement.

74. The land subject to the East Side Area NOR is ideal for the expansion of the aircraft apron because:

    (a) It is adjacent to the existing passenger aircraft apron and can be developed incrementally responding just in time to demand;

    (b) Aircraft parking stands can be developed on both sides of a new southern terminal pier enabling efficient aircraft servicing and passenger walking access within the passenger terminal; and

    (c) The expansion area is sufficiently easterly distant from the airport runway to enable the design of a compliant terminal and taxiway system.

75. The **easterly** extent of East Side Area land required is influenced by the following factors and is depicted at page 9 of the report at **Annexure F**:

(a) The existing alignments of the runway and full length parallel Taxiway Alpha which determine the starting points from which new infrastructure is set out;

(b) The alignment of Taxiway Bravo which runs parallel to Taxiway Alpha, but only over the length of the terminal precinct – the purpose for this second taxiway is to facilitate the efficient circulation and safe passing of aircraft moving in opposite directions and to provide a future safeguard against the possibility that significant operational restrictions might, in future, be imposed on Taxiway Alpha, as discussed above;

(c) A new taxilane parallel to Taxiways Alpha and Bravo, to facilitate aircraft entering and leaving parking stands on the western side of the new pier, without conflict to aircraft on Taxiway Bravo, as discussed above;

(d) There will be direct benefits in terms of incremental carbon emission reduction arising from having this new taxilane together with Taxiway Bravo in terms of minimisation and avoidance of taxi delays for aircraft arriving from and departing to the runway. Mr Conway has provided more details of such benefits in his statement of evidence;

(e) Requirement for new aircraft stands on the western side of the new South Pier to be positioned sufficiently far east so that higher aircraft tails (such as Boeing 777 or 787) will not infringe the OLS. Refer to the graphics at **Annexure E** for the depiction in cross-section view of the aircraft parking stands in relation to the OLS;

(f) The apron depth on both sides of the terminal pier to accommodate the anticipated longest aircraft;

(g) Taxiway and taxilane separation and clearance distances;

(h) Apron depth and clearance distances appropriate for the class of aircraft to be accommodated, including allowances for aircraft servicing equipment;

(i) The terminal pier width to be protected for optimum internal functionality including concourses, boarding gates and amenities, nominally set at 40m[15] at this early stage;

(j) Allowance for airside roads behind and in front of aircraft parking stands;

(k) Boundary fencing; and

(l) Landscape buffer areas.

76. The **southerly** extent of East Side Area land required is influenced by the following factors and is depicted at page 7 of the report at **Annexure F**:

(a) The southerly extent of the existing terminal building (Southwest Pier) which determines the starting point where new aircraft parking spaces are set out from;

(b) The number of aircraft parked across the apron in a southwards line along the face of the future pier;

(c) The dual taxilane system passing west to east to the south of the future new pier;

(d) Taxilane separation and clearance distances in a north to south direction;

(e) Remote stand parking requirements for Code C turboprops;

(f) Additional space for operational support functions such as airside roads and storage of ground support equipment[16];

(g) Boundary fencing; and

[15] The dimension of 40m width for the future pier is in line with typical modern airport piers serving boarding gates on both sides, providing for appropriate facilities and amenities in accordance with IATA ADRM.

[16] Ground support equipment (GSE) are the various components of equipment needed to service an aircraft when parked during an unloading/loading turnaround.

(h) Landscape buffer areas.

77. The East Side Area is primarily required to accommodate the parking, movement and servicing of the expected number of concurrent aircraft up to the planning horizon of 12 MPPA throughput capacity.

78. The future aircraft are planned to be parked on both the western and eastern sides of a future new pier, extending southwards from the existing terminal building. The western area of aircraft parking is located generally where smaller turboprop aircraft are presently being manoeuvred and parked. The eastern area of aircraft parking is located generally where car parking is presently located.

79. The further extent of land to the south and east is principally required for the movement and manoeuvring of aircraft between the runway/taxiway system and the eastern parking apron. The key components of infrastructure are for taxilanes[17] which are prescribed pathways for aircraft to manoeuvre with safe clearance distances from other aircraft and obstacles.

80. A dual taxilane system will be required to provide for efficient two-directional flows in and out of the cul-de-sac apron area to the east of the future pier.

81. The East Side Area will be developed progressively in stages, generally responding just in time for anticipated growth in demand for aircraft parking and aviation support services. In his evidence, Mr Howarth of WIAL has provided details of how the development is expected to be staged.

Effects of Covid-19 on the Masterplan

82. An obvious question to ask at this time is what are the effects that the Covid-19 pandemic is now having and might in future have on the substance and timing of the Wellington Airport Masterplan as it relates to the ESA. Viewed through today's lens in the midst of the massive disruption to social and economic life caused by the pandemic and government responses to manage the effects, it is reasonable to query whether the Masterplan is overly optimistic and still relevant.

[17] A taxilane is a type of aircraft taxiway used primarily for access into and out of an aircraft parking bay.

83. Although local and global air traffic has been severely impacted by the travel restrictions imposed to control the spread of the virus, there has also already been evidence of the resilience of demand for air travel.

84. New Zealand's level of domestic air travel has shown a rapid and strong recovery to 80-90% of pre-Covid levels, in periods of time when the whole country has been at Level 1 restrictions. This has also occurred in the absence of international visitors travelling on domestic services, which usually make up some 15% of passenger numbers.

85. And as we are all aware, the New Zealand government has recently opened the border to quarantine-free travel from Australia, completing the arrangements for the long-awaited Tasman travel bubble. Early indications are that travel capacity will be quickly reaching around 50% of pre-Covid levels and then growing steadily back to normal levels.

86. For Wellington Airport, the major travel markets and destinations that it serves are these two - domestic New Zealand and Australia. It is anticipated that these are the ones that will be most resilient, and which can be expected to most quickly regain pre-Covid levels, potentially over the next one or two years.

87. Full recovery for long haul international travel will likely take quite a lot longer, perhaps out to 2024 or 2025, because of the complexities of ensuring public health safety for travel from so many countries with differing virus situations. However, New Zealand can realistically still expect to experience very strong global interest for visitors wanting to come here, and Wellington will benefit from a flow-on from that strong demand.

88. Mr Vincent has provided more detail about the expected recovery beyond 2024 in his statement of evidence. He has indicated that he expects that the drivers of demand for travel to Wellington will recover steadily although may result in an overall shift of the forecasts by 3 to 4 years later from the pre-Covid trend.

89. Taking this into account, and based on my experience as an specialist airport planning adviser which has included numerous air traffic forecasting and master planning commissions, it is my opinion that, notwithstanding the severe disruption caused by the Covid pandemic, the Airport Masterplan as it relates

to the ESA, with primary anticipated development including new international processing facilities occurring towards the south-east, remains robust, appropriate and relevant for its primary purpose of identifying and protecting land requirements for accommodating long term aeronautical requirements, out to the planning horizon of 12 MPPA capacity.

SUBMISSIONS

90. Submissions directly on matters that I have expertise to respond to, express concern on primarily two matters – the first that adequate consideration has not been given by WIAL to alternative methods to achieve its objectives for meeting passenger demand – and second that WIAL has not provided a comprehensive assessment of alternative sites.

91. Regarding the matter that adequate consideration has not been given by WIAL to alternative methods to achieve its objectives for meeting passenger demand, various suggestions provided by submitters include:

    (a) "WIAL has chosen to use land on the east side rather than under-utilised land on the western side" (submission by Matthew Pohio);

    (b) "WIAL could redesign its Masterplan to have a small terminal on the west side for regional flights with passengers transferring via shuttle, as at Auckland Airport" (submission by Naomi and Stephen Smith);

    (c) "WIAL could remove a hillock rather than move into east side area" (submission by Jeff Weir);

    (d) "WIAL has chosen to put a jet-capable taxiway and road as close to residents as the land and noise limitations will possibly allow them to" (submission by Jeff Weir);

    (e) "Intensification of activities on the existing site is obviously one way the Airport can accommodate growth – airport is obviously not tapped out for growth opportunities or efficiency within existing footprint" (referring to submissions by Generation Zero, Jeff Weir, WCC Environmental Reference Group, Guardians of the Bays and Tim Jones);

(f) "The NOR is silent on what growth the existing site could reasonably accommodate" (submission by Jeff Weir)"; and

(g) An alternative would be better use of the existing zoned area and/or a smaller designation footprint" (submissions by International Climate Safe Travel Institute, Guardians of the Bays and Tim Jones).

92. Regarding the matter that WIAL has not provided a comprehensive assessment of alternative sites, one submitter has suggested developing Paraparaumu Airport, saying that "site has more space and potential for growth which Wellington airport is lacking" (submissions by Generation Zero, David Wood, Sergio Ayrosa, Brittany Trillford, Phillip Mann and Robyn Moriarty).

Response – Alternative Methods

93. Airbiz and WIAL have considered whether there are practical and feasible alternatives to the East Side Area solution for meeting the longer term requirements for Wellington's airport infrastructure. These have included considering providing incremental passenger aircraft parking spaces in other locations on the airport site, such as on the western (opposite) side of the runway;

94. There are no substantial areas of Wellington Airport land that are not currently developed or are not allocated for development as part the Masterplan. The Masterplan drawing showing the extent of the proposed development on the East Side Area on the golf course can be found in **Annexure B** appended to this statement.

95. Providing part or all of the terminal precinct infrastructure on the western side of the runway is not practical or sustainable long term, either operationally or space-wise.

(a) The western apron area already accommodates a full range of activities including General Aviation and military that would need to be displaced and provided elsewhere, should this area be reassigned for passenger aircraft uses;

(b) There is an area of non-aeronautical commercial activity at the western perimeter of the western precinct (retail park). In his statement of evidence, Mr Clarke indicates that WIAL anticipates that this activity will need to be progressively phased out to provide additional land space for the general aviation (non-passenger) activities that are already occupying the western area;

(c) The new air traffic control tower is itself located in the western area, presently in the retail park, but anticipating that there will be general aviation activities in this location in the future.

(d) There are no terminal facilities on the western side of the runway – access to and from aircraft for passengers and baggage would be highly problematic if passenger and aircraft facilities were located on both sides of the runway and therefore were not contiguous.

(e) Locating passenger terminal facilities on the western side area would impose severe ground transportation access effects on the substantially suburban residential surroundings;

(f) There is currently no parallel taxiway on the western side of the runway and no space to provide one other than to a limited extent in the vicinity of the Western Apron area. WIAL anticipates that this short section of taxiway will be built in the mid-term future to facilitate aircraft movements in the western area. Doing this will itself displace some areas currently being used for General Aviation aircraft parking.

(g) As a consequence of the lack of space available to provide a full length parallel taxiway on the western side of the runway, aircraft that are parked on the western side need to cross the runway to be able to access the full length taxiway on the eastern side to get then access to the ends of the runway. Runway crossings are very inefficient on runway utilisation and capacity and have inherent safety issues, and accordingly should not be an inherent operational feature for regular passenger aircraft operations.

(h) In respect of the “hillock” referred to by a submitter, I have taken this to be referring to a small knob located towards the southern

perimeter of the East Side Area. In itself, this is not a significantly large space and would probably only provide space for parking one aircraft. The removal of the hillock is necessary to provide sufficient space to the south of the terminal precinct for the provision of the taxiways to access the East Side Area. WIAL staging plans anticipate that the hillock will be removed by 2029 and the space under it will be used as part of the East Side Area development, including the taxiway access as well as ground servicing equipment storage and airside service road.

96. In respect of the suggestion by a submitter that WIAL has chosen to put a jet-capable taxiway and road as close to residents as the land and noise limitations will possibly allow them to, I respond as follows.

97. My earlier evidence explains in detail the regulatory, technical and geometric bases for the set out of the easterly ESA running dimensions from the runway. This demonstrates that WIAL has in fact planned the location for the eastern taxiway, road and ESA boundary in a rational manner to be as far away as practical from residents.

98. In respect of the comments by various submitters that, inter alia,

    (a) the NOR is silent on what growth the existing site could reasonably accommodate;

    (b) that better use of the existing zoned area and/or a smaller designation footprint could be achieved; and

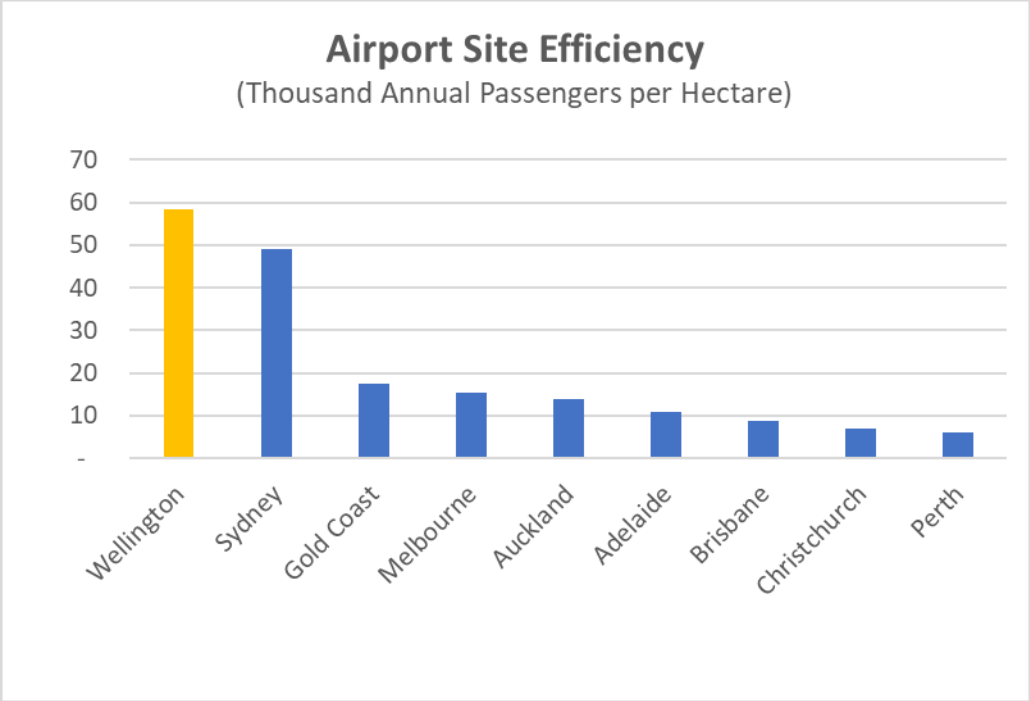
    (c) that airport is obviously not tapped out for growth opportunities or efficiency within existing footprint.

    I respond as follows.

99. In his evidence, Mr Howarth has stated that WIAL considers that the operational efficiency of the existing airport site (without ESA) is restricted by the number of available aircraft stands. I have previously been involved in the planning and analysis work that has underpinned Mr Howarth's viewpoint and accordingly I also concur that development of new apron is required to increase busy hour capacity.

100. The ESA staging drawings provided in Mr Howarth's evidence depict the development pathway from today's capacity (approximately 6 MPPA) progressively through to 12 MPPA.

101. Wellington Airport is the most intensively and efficiently utilised airport site in Australasia. Much of this intensity of use is driven by the fundamental constraint of having such a small site. A simple measure of this effectiveness is shown by the following graphic comparisons of annual passenger throughputs per hectare of site area[18]:



102. Wellington Airport has a site efficiency of almost 60,000 annual passengers per hectare of site. Sydney Airport, another "city airport" is the only other Australasian airport that comes anywhere close to Wellington's site efficiency.

103. WIAL achieves this intensity of land utilisation through astute infrastructure planning and operational strategies that deliver high efficiency, including:

(a) Integrated terminal facilities (Domestic and International in the same building, sharing many processes such as access roads, vehicle parking, kerbside, check-in, baggage handling, food and beverage, shops, and services such as rental car hire;

[18] Annual passenger traffic is for 2019. Australian airport traffic sourced from BITRE; New Zealand airport traffic sourced from airport websites.

(b) Swing facilities, where domestic and international share the use of facilities at their differing peak period demand times, such as aircraft parking stands, aerobridges, departure lounges, and baggage reclaim belts;

(c) Vertical construction, including multi-storey car parking and the multi-level terminal building; and

(d) Provision of highly flexible aircraft parking stands called Multiple Aircraft Ramp System (MARS) stands, by which two smaller Code C jet aircraft can be parked on the same stand where one larger wide body aircraft is accommodated, at differing times of usage.

104. The outcome of these planning and operational strategies is that the current airport site will reach its ultimate throughput capacity with the existing site fully and intensively utilised, in the near future. To expand to 8 MPPA and beyond that level of activity, there are no other spaces or practical alternatives to increase the capacity of the airport on the current site, other than expanding onto new contiguous land.

Response to submissions suggesting moving Wellington Airport

105. Providing a new airport for Wellington at another location would be highly challenging, in terms of:

(a) Finding a site with substantial land holdings with little or no pre-existing development, minimal surrounding terrain and reasonably benign meteorological conditions.

(b) Proximity to the major population centres of Wellington, Hutt Valley and Porirua basin.

(c) Provision of quick, convenient and cost-effective ground transportation infrastructure and services to provide access between the various population centres and such an airport for travellers, visitors and employees.

(d) Economic feasibility of replicating the substantial infrastructure that has already been invested into the current site for both airport facilities and ground transportation.

106. In respect of minimising the effects of ground transportation and access to the airport, no alternative site could achieve and deliver the economic and environmental benefits that the current Wellington Airport does, by virtue of being a genuine “city airport”, located only 6 km from the city CBD and in close proximity to the main population centres.

107. I am aware of a previous study of potential alternative sites for an airport for the Wellington region. In 2013, Airbiz, under my direction, prepared a report for WIAL as part of the continuing master planning work, reviewing an earlier alternative location study carried out by Works Consultancy in 1992. The Airbiz report can be found at **Annexure G** appended to this statement.

108. Both the Works Consultancy report and the Airbiz review report concluded that there was no potential alternative location for an airport that was better than the present site.

109. Although the Works Consultancy study was undertaken a long time ago, the broad criteria used for assessing suitability of candidate sites are still applicable today and the conclusions from both reports are still valid today.

CONCLUSION

110. In my opinion, supported by the evidence that I have provided in this statement, WIAL has undertaken thorough and robust master planning to establish that:

(a) The Wellington Airport site is very efficiently and intensively utilised;

(b) The maximum throughput capacity of the existing site will be reached in the near future;

(c) Air traffic demand will recover from the Covid pandemic disruption, resuming forecast growth trends, albeit with a shift of 3 to 4 years, and WIAL plans to undertake terminal and apron development work by 2029 to accommodate 8 MPPA throughput;

(d) The Airport Masterplan, with primary anticipated development including new international processing facilities occurring towards the south-east, remains robust, appropriate and relevant for its

primary purpose of identifying and protecting land requirements for accommodating long term aeronautical requirements;

(e) Spatial and land requirements and geometric configurations assessed in the Masterplan have been based on appropriate forecasts, relevant regulatory compliance and the most likely future aircraft fleet mix[19];

(f) There is no additional land available on the current airport site that is contiguous with the existing passenger terminal and apron precinct and thereby practical and suitable for expansion to achieve demand of 8 MPPA and beyond; and

(g) There is no potential alternative location for an airport that is better than the present site.

111. Therefore it is necessary, in order to provide the spatial area requirements for the future 12 MPPA airport capacity (at approximately 2040) as indicated by the Masterplan layout and to increase busy hour capacity limitations that already face the airport, to extend on to the East Side Area land.

Iain Munro

5 May 2021

[19] Future aircraft fleet mix has considered aircraft types expected to be manufactured, the types appropriate for Wellington's air route network (short haul Tasman/Pacific, domestic main trunk and domestic regional) and expected aircraft selections by the main airlines operating at the airport.

ANNEXURE A: WELLINGTON AIRPORT SITE AND COMPARISONS WITH AUCKLAND AND CHRISTCHURCH AIRPORTS

ANNEXURE B: WELLINGTON AIRPORT MASTERPLANS (HISTORIC AND CURRENT)

ANNEXURE C: EAST SIDE AREA DEVELOPMENT – SET-OUT DIMENSIONS FOR TAXIWAYS

ANNEXURE D: GENERIC SET-OUT FOR OBSTACLE LIMITATION SURFACES

ANNEXURE E: WELLINGTON AIRPORT OBSTACLE LIMITATION SURFACES AND RELATIONSHIP WITH KEY BUILDINGS AND AIRCRAFT STANDS

ANNEXURE F: REPORT – SET-OUT DIMENSIONS FOR EAST SIDE AREA

ANNEXURE G: ALTERNATIVE AIRPORT SITES REPORT