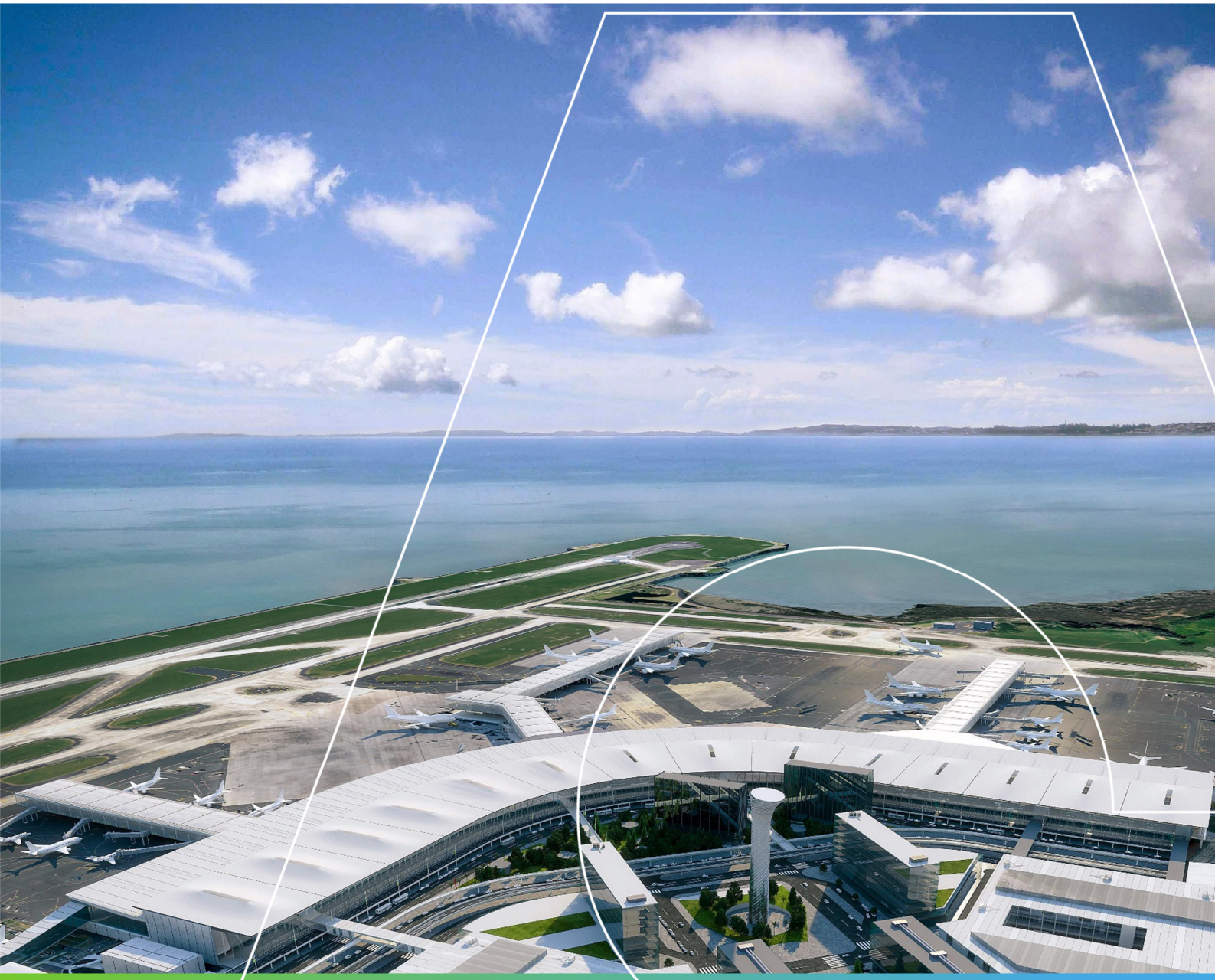


Appendix B: Forecast Aeronautical Capital Expenditure

Price Setting Disclosure: 1 August 2017

Auckland Airport

IMPORTANT MESSAGE ON FORWARD LOOKING STATEMENTS AND FORECASTS

This document has been prepared for the sole purpose of complying with the Airport Services Information Disclosure Determination 2010 (the "**Determination**"). As required by the Determination, the document contains forward looking statements, forecasts and comments about future events, including our expectations about the performance of Auckland Airport's business. Forward looking statements and forecasts involve inherent risks and uncertainties, both general and specific, such that there is a risk that such forward looking statements or forecasts will not be achieved.

Factors that could cause Auckland Airport's actual results to differ materially from the forecasts include matters outside of our control, such as the inherent risk that forecast aircraft and passenger demand (which is based on third party information) departs from actual demand due to global economic conditions, changing airline priorities and other material events beyond the control of Auckland Airport. For matters over which we have greater control, such as capital and operational expenditure, the forecast periods in this disclosure are long-dated, running in some instances to ten years. It is very likely that the assumptions informing the forecasts, and therefore the forecasts themselves, will change during the forecast period.

As such, the information in this document must be interpreted with care. It must not be relied on for any purpose other than to assess whether Auckland Airport is meeting the purpose of regulation under Part 4 of the Commerce Act. The information in the document will be subject to a review by the Commerce Commission, who will publish a summary and analysis report in accordance with the Commerce Act 1986.

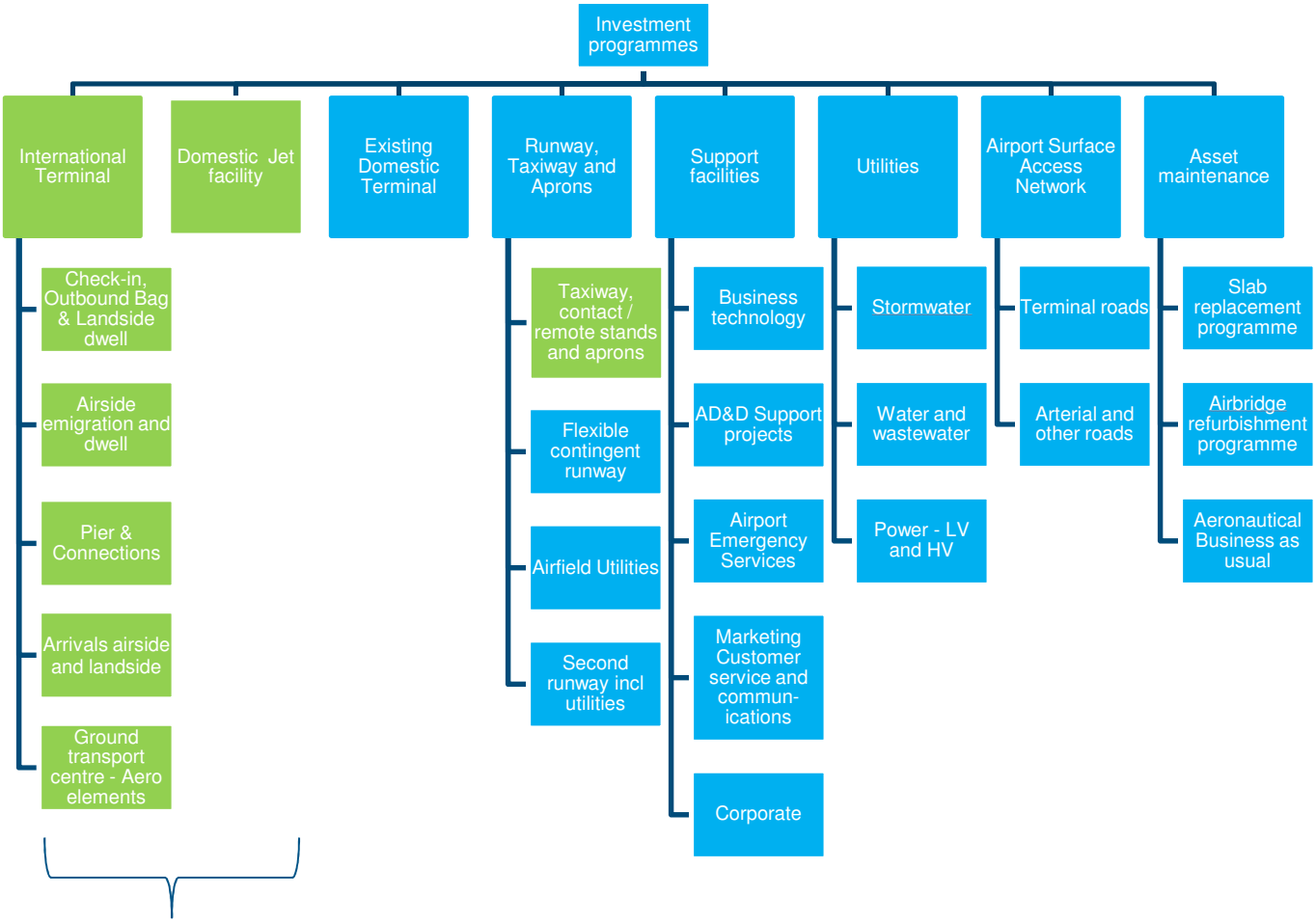
To the maximum extent permitted by law, Auckland Airport will not be liable (within tort (including negligence) or otherwise) to any person in relation to this presentation, including any error in it.

Introduction: Capital Investment Programme Descriptions

This Appendix provides an overview of the aeronautical and aeronautical-related capital expenditure aims and objectives for PSE3 and PSE4, including cost estimates.

Programme hierarchy

The following diagram provides an overview of the programmes and projects in the aeronautical capital investment programme. The airport is a system with interfaces throughout. The green shading highlights projects that have been included within the scope of the Terminal Development Plan ("**TDP**"), discussed further in this document.



Process for determining the need including assessment criteria

Overview of approach to investment planning and development principles

Auckland Airport is approaching a critical time for capital investment. Key expansions to the international terminal building are underway and further international developments are required, we are approaching the integration of domestic and international facilities in some form, and the second runway development is on the horizon. In addition, recent growth has led to multiple demands for new infrastructure. As a result, the forecast capital envelope for the next 10 years is unprecedented in the 50 year history of Auckland Airport.

Aviation is an industry that has historically been subject to material and ongoing changes in demand, supply and operational dynamics. Given that these changes are likely to continue into the future, Auckland Airport draws on the following development principles when deciding to invest in long-life assets and seeking to manage the associated uncertainty:

- Safe and secure: Our operation must remain safe and secure, meeting new regulatory and statutory requirements that change over time.
- Demand driven: We must look at the medium to long-term trends as the short-term view can be volatile.
- Timely and resilient: Airport infrastructure takes time to plan, design and build. These development timeframes need to be allowed for. Resilience is required to maintain operations through periods of development and in the event of outages.
- Affordable, stageable and efficient: We seek to identify manageable stages that best match demand and capacity, while also considering the efficient development of the overall programme of works in a given year. Smoother inter-year capital profiles generally support these principles.
- Flexible and innovative: We need to manage and influence the levers which can create headroom from existing infrastructure (e.g. technology and continuous improvement) and think creatively in identifying the range of options for resolving a given issue.

These development principles have informed Auckland Airport's planning process for aeronautical investment for PSE3. Auckland Airport's capital plan has also been informed by the design objectives embedded in the most recent iteration of its masterplan, published in 2014 ("**Masterplan**"). Consistent with the objectives of the Masterplan, Auckland Airport's planning process for PSE3 and PSE4 has therefore sought to:

- ensure the long-term operational, safety and commercial aviation requirements of the airport continue to be met. This includes the delivery of additional capacity that will enable economic growth and that is informed by long-term thinking;
- deliver an overall airport system with the capacity and ability to adapt to changing environmental, social, technological and economic conditions and pressures;
- meet the needs of modern airport users, including airlines and passengers;
- provide a high quality connection for passengers transferring between domestic and international services;
- provide access to and from the airport for the maximum range of transport modes, including facilitating public transport access and protecting for future connectivity (including rail) in a clear, efficient and effective manner;
- design and deliver infrastructure in a manner that enables Auckland Airport's role as an international, national and regional gateway for airlines, commuters, tourists, visitors and workers; and
- reflect the distinctive character of Auckland Airport, including promoting and enhancing New Zealand's unique culture and heritage.

Developing the plan for PSE3

The Masterplan established an overall future location for Auckland Airport's operations, with a domestic processor in the south and an international processor in the north. However, the 2014 Masterplan involved significant changes from the previous Masterplan and did not provide detailed information on how the terminal or airfield infrastructure should be configured or developed over time.

A number of planning studies have been completed since the release of the Masterplan to inform the various elements of the airport network including the Core Capacity Study (2014), the Domestic Terminal Gap Study (2014), the Airport Development Plan (2015), Airport Surface Access Network Plan (2016) and Utilities Study (2016), the Runway Timing Study (2017) and the TDP – Feasibility Stage (March 2017).

The TDP forms the concept-level "blue-print" for the development of Auckland Airport's terminal infrastructure. The aim of this study was to investigate and identify, over a 30 year planning horizon, a preferred development pathway for the integrated terminal and airfield system, including the optimal balance for the integration between domestic and international operations. The feasibility study was undertaken over the course of 2016 and also involved planning for the location and broad dimensions of the domestic processor ("**DP**") within the integrated terminal.[1] Substantial customers were heavily involved in the study, and feedback was also sought from border agencies as the pathway was developed.

A key input to the study of terminal and airfield requirements was the throughput and busy hour forecasts developed by DKMA. Theoretical facility requirements were developed by function to determine spatial / infrastructure requirements for demand at 20, 25, 30 and 40 million passengers, which also contemplated likely changes in technology for each airport function.

In September 2016, the emerging draft capital plan for PSE3 was provided to customers as part of the pricing consultation process, drawing on the most recent relevant studies for key programmes of work and the status of the TDP and DP feasibility study at that time. Auckland Airport sought airline feedback and views on airline requirements at this early stage and then throughout the remainder of the pricing consultation process as the draft capital investment plan was tested and refined and as the TDP / DP feasibility study was finalised in early 2017. Early drafts of the capital plan did not meet stakeholder affordability tests. Through a process of consultation, staging options were developed which were more optimised at peak and involve active targeting of growth outside of the peak through the pricing period. Final feedback was considered before the final aeronautical and aeronautical-related capital expenditure plan for PSE3 was determined in June 2017.

The demands of the travelling public have not been directly assessed at a detailed level. We have undertaken a survey of consumer views on infrastructure development at Auckland Airport. Surveyed participants were very supportive of investment that continues to provide choice in peak services, saves time (e.g. avoiding the walk between the domestic and international terminal for jet operations), reduces delays or queues and provides choice in transport options to and from the airport.[2]

Looking ahead to PSE4

Auckland Airport's approach to capital planning has also involved looking ahead to PSE4, to ensure consistency of fit between the projects planned for PSE3 (and included in aeronautical pricing) and the medium to longer-term development pathway. Information about these forecast projects has been shared and tested with airlines through the pricing consultation process.

As required under the ID Determination, this Appendix (and the forecast capital expenditure disclosed in Schedule 18) provides information about the forecast capital expenditure over the ten year period encompassing both PSE3 and PSE4, along with the aims and objectives of the key capital expenditure projects over that ten year forecast period.

However, as noted on the cover to this Appendix, our experience has been that the forecast capital expenditure for PSE4 (i.e. the 6-10 year forecast) will require significant review ahead of the next pricing period to recalibrate the material capacity that will be delivered over the next five years against the inevitable changes in industry conditions, fleet mix, business models and technologies. The capital plan for PSE4 will also be

[1] Domestic Processor and Terminal Development Plan – Feasibility Study 2016 (Airbiz Consortium including BECA, SOM, Ashcote Consulting and Aecom).
[2] TNS Survey May 2017, sample size 1000.

retested through consultation with our substantial customers in five years' time. It is therefore possible that there may be material changes in the scope and form of the projects set out in this Appendix.

Five and ten year capital investment programme – base case cost estimation

This Appendix provides a high level overview of the 5 and 10 year capital investment programme, projects, sub-projects and costs. The aeronautical pricing process involved a thorough review of inputs and priorities and established critical aeronautical pricing priorities for the next five years. The six to ten year view provides greater context to the plan, but is subject to greater review over time, including ahead of the next aeronautical pricing consultation.

Cost estimates are subject to variability depending on the level of design analysis that has been undertaken. Auckland Airport is at feasibility design in the capital planning process for most projects beyond FY17/FY18 and has commenced concept design for the TDP. Projects related to the TDP consultation and their associated draft sub-projects, as well as any other projects informed by major feasibility studies, have generally been priced by external quantity surveyors (BECA, AECOM). Feasibility stage project and sub-project costings are subject to a material degree of uncertainty. Business as usual projects and sub-projects have generally been internally estimated. The second runway costs estimates are based on inception level design and subject to greater cost-outturn variation.

Capital decision making will be responsive to new information

As noted through the pricing consultation, we consider that it is important and efficient for Auckland Airport to retain flexibility in how and when we invest to solve capacity and other operational challenges. A range of options typically exist for resolving any given issue, and there will inevitably be differences between the forecast capital plan and the way investment is actually delivered over the pricing period.

This plan represents our best estimate of project delivery over PSE3, as at June 2017. As discussed with substantial customers through the pricing consultation, we consider that it is important and efficient for Auckland Airport to retain flexibility in how and when we invest to solve capacity and other operational challenges. A range of options typically exist for resolving any given issue, and there will inevitably be differences between the forecast capital plan and the way investment is actually delivered over the pricing period as new information comes to hand. Auckland Airport has made it clear to substantial customers that this is a base case plan and that consultation as required under the Airport Authorities Act 1966 and in accordance with good due process will occur ahead of key investment decisions, particularly on the form and function of projects.

We propose to continue to work with the BARNZ Cost and Regulatory Committee over the next five years to discuss any material changes to timing, costs, or re-purposing of capital expenditure compared to this forecast plan. We consider this process has worked well for PSE2, and enabled Auckland Airport to make the necessary trade-offs to respond to changing circumstances over the period, based on a good understanding of what our airline customers value. There has been broad support for this approach from key stakeholders.

Extent to which base case capital projects have been included in pricing

At the end of this document we summarise the costs for PSE3 and PSE4 and the extent that projects have been included in PSE3 pricing for standard aeronautical charges.

Structure of this Appendix

Capital expenditure is categorised according to "programmes", "projects", and "sub-projects". This document provides descriptive background on the programmes that together contribute to either one output or a set of broadly overlapping outputs and key projects. A range of alternatives can exist to deliver outputs at the programme level. As was the case in the last pricing period, Auckland Airport will keep stakeholders up to date on major changes and seek customer input through consultation on major changes throughout PSE3. For ease of reference, the page numbers for programmes and sub-projects are set out below.

Staging diagrams

The diagrams on the following pages provide a high level indication of the proposed investment staging. Where possible sub-projects will be commissioned in stages. Diagrams show when all elements of sub-projects are planned for delivery.

STAGING

FY2018

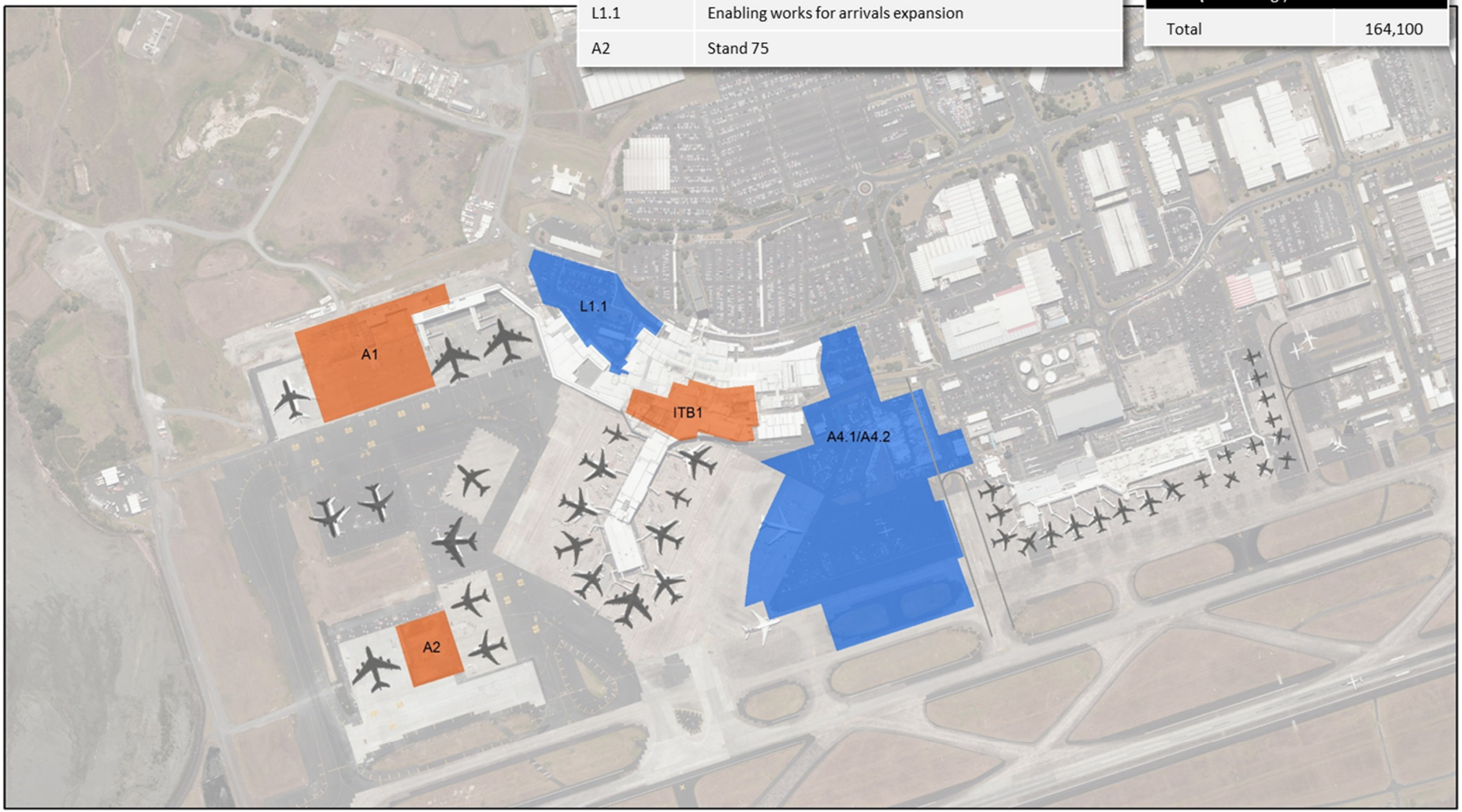
Enabling

Construction

Project Code	Project
A1	Pier B Gates 17 and 18 (Phase 4)
A4.1/A4.2	Enabling & displacement projects (Eastern)
ITB1	Level 1 Departures Expansion (Phase 3)
L1.1	Enabling works for arrivals expansion
A2	Stand 75

Passengers (MPPA) (DKMA Aug.)	
Domestic	8.8
International	10.3
Total	19.1

ATM (DKMA Aug.)	
Total	164,100



STAGING

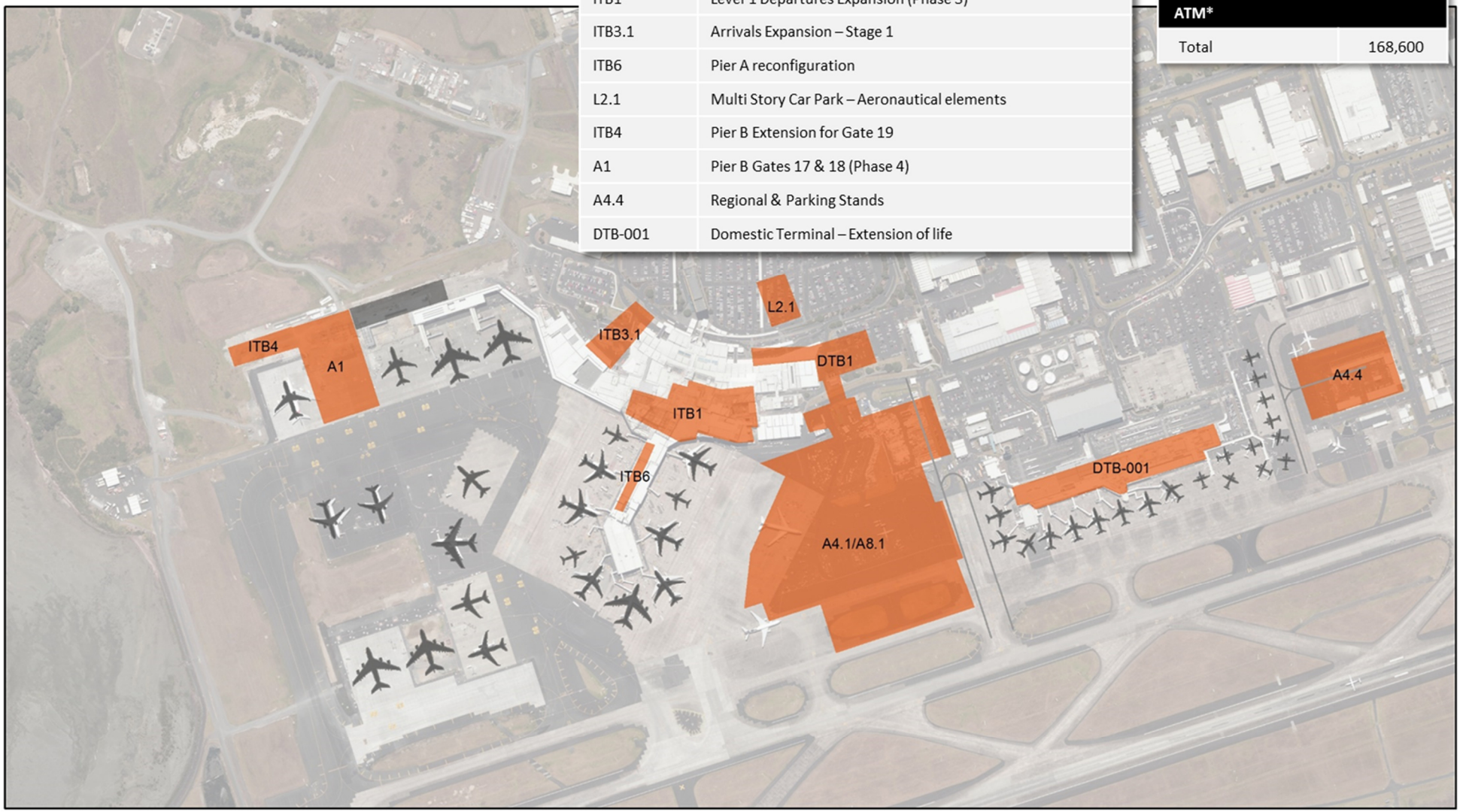
FY2019

Completed

Construction

Project Code	Project
DTB1	Domestic Processor – Stage 1 NZ & Jetstar
A4.1/A8.1	Eastern Apron Redevelopment
ITB1	Level 1 Departures Expansion (Phase 3)
ITB3.1	Arrivals Expansion – Stage 1
ITB6	Pier A reconfiguration
L2.1	Multi Story Car Park – Aeronautical elements
ITB4	Pier B Extension for Gate 19
A1	Pier B Gates 17 & 18 (Phase 4)
A4.4	Regional & Parking Stands
DTB-001	Domestic Terminal – Extension of life

Passengers* (MPPA)	
Domestic	9.1
International	10.7
Total	19.9
ATM*	
Total	168,600



STAGING

FY2020

Completed

Construction

Project Code	Project
DTB1	Domestic Processor Stage 1 – NZ & Jetstar
ITB3.1	Arrivals Expansion – Stage 1
ITB4	Pier B Extension for Gate 19
L2.1	Multi Story Car Park – Aeronautical elements
A8.1	Eastern Apron Redevelopment
DTB-001	Domestic Processor – Extension of life

Passengers* (MPPA)	
Domestic	9.4
International	11.1
Total	20.5
ATM*	
Total	172,000

STAGING

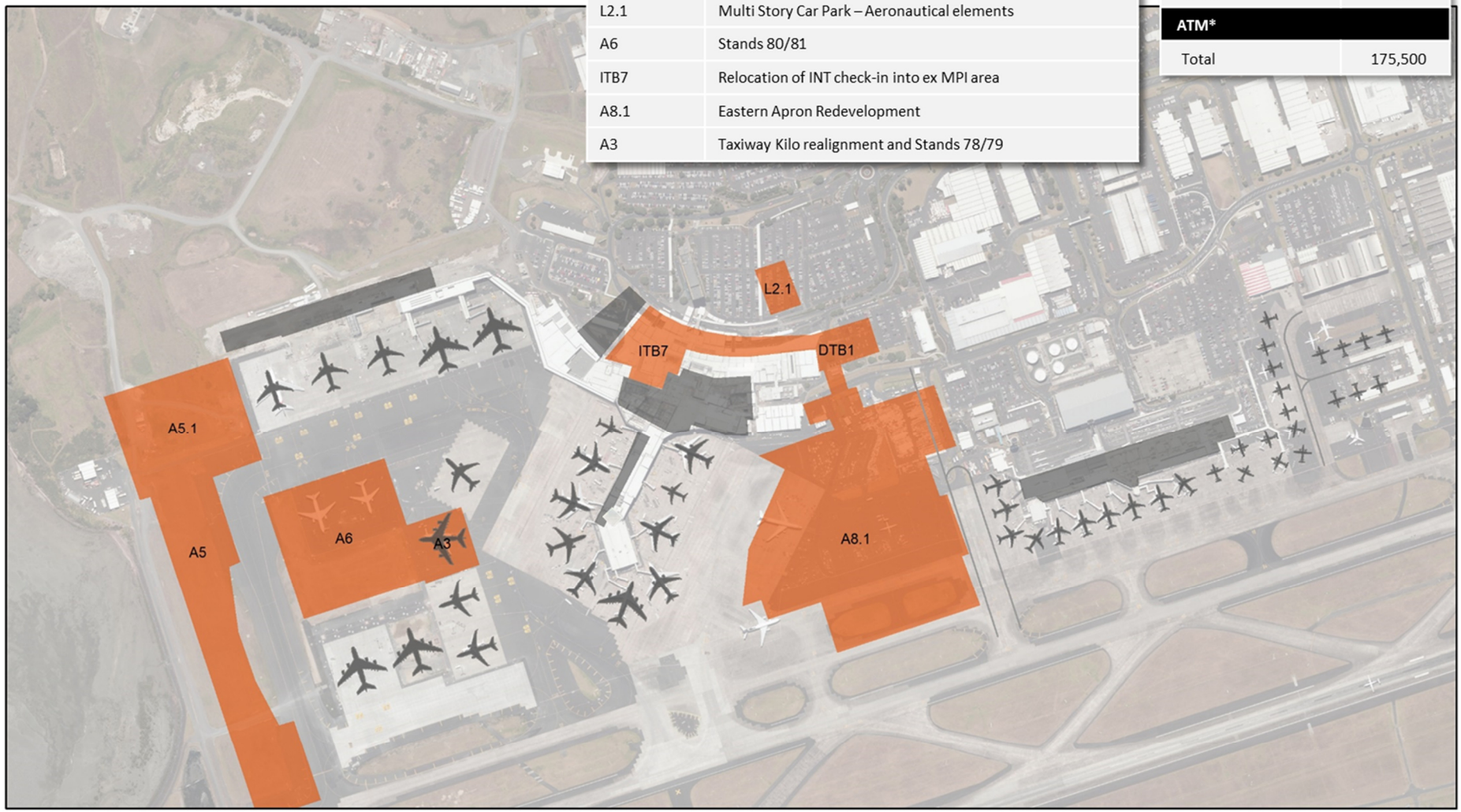
FY2021

Completed

Construction

Project Code	Project
A5/A5.1	Taxiway Lima and Mike Extension
DTB1	Domestic Processor – Stage 1 NZ & Jetstar
L2.1	Multi Story Car Park – Aeronautical elements
A6	Stands 80/81
ITB7	Relocation of INT check-in into ex MPI area
A8.1	Eastern Apron Redevelopment
A3	Taxiway Kilo realignment and Stands 78/79

Passengers* (MPPA)	
Domestic	9.6
International	11.5
Total	21.1
ATM*	
Total	175,500



STAGING

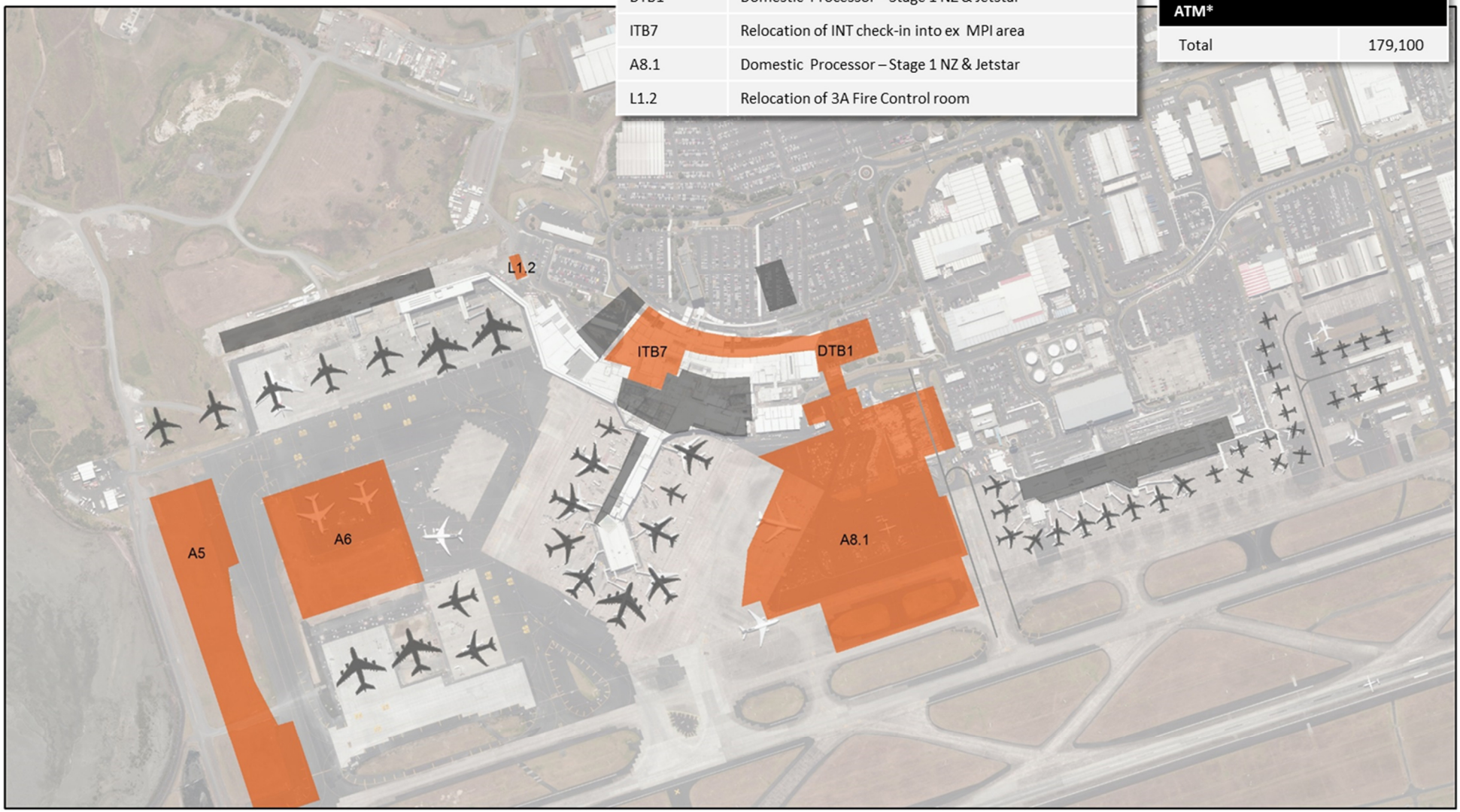
FY2022

Completed

Construction

Project Code	Project
A5	Taxiway Mike Extension
A6	Stands 80/81
DTB1	Domestic Processor - Stage 1 NZ & Jetstar
ITB7	Relocation of INT check-in into ex MPI area
A8.1	Domestic Processor – Stage 1 NZ & Jetstar
L1.2	Relocation of 3A Fire Control room

Passengers* (MPPA)	
Domestic	9.9
International	11.9
Total	21.8
ATM*	
Total	179,100



STAGING

FY2023

Completed

Construction

Project Code	Project
A9	Pier B northern apron
A9a	Pier C remote stands
A3	Taxiway Kilo realignment and Stands 78/79
DTB2	Domestic Processor – Stage 2 Terminal Integration
ITB3.2	INT Northern Bag Reclaim Expansion
ITB 5a	Wedge Stage 1 –interim works
L2.3	Plaza/Forecourt
A4.5/A4.3	Eastern Apron Redevelopment

Passengers* (MPPA)	
Domestic	10.2
International	12.4
Total	22.5
ATM*	
Total	182,900

STAGING

FY2024

Completed

Construction

Project Code	Project
A9	Pier B northern apron
A9a	Pier C remote stands
ITB3.2	INT Northern Bag Reclaim Expansion
L2.3	Plaza/Forecourt
DTB2	Domestic Processor – Stage 2 Terminal Integration

Passengers* (MPPA)	
Domestic	10.4
International	12.9
Total	23.3
ATM*	
Total	186,700

STAGING

FY2025

Completed

Construction

Project Code	Project
ITB 3.1	Arrivals Expansion – Stage 2
ITB 8	Northern International Contact Stands

Passengers* (MPPA)	
Domestic	10.7
International	13.3
Total	24.1
ATM*	
Total	190,600

STAGING

FY2026

Completed

Construction

Project Code	Project
ITB 8	Northern International Contact Stands

Passengers* (MPPA)	
Domestic	11.0
International	13.9
Total	24.9
ATM*	
Total	194,600

STAGING

FY2027

Completed

Construction

Project Code	Project
ITB 5b	Wedge - Stage 1
ITB 8	Northern International Contact Stands

Passengers* (MPPA)	
Domestic	11.4
International	14.4
Total	25.8
ATM*	
Total	198,700

PROGRAMME AND PROJECT DESCRIPTIONS

1. Integrated Facility

Overall programme description

Description including aims and objectives	The integrated facility programme aims to implement the necessary steps for integration and to deliver increased common use across domestic and international terminal and airfield facilities over time. Arrivals is an exception to this as it is currently expected that separate facilities will continue to be required. The programme aims over time to remove the current separation between the domestic and international terminal facilities. Goals include a better passenger experience, more efficient airline operations, improved intuitive wayfinding, improved passenger and baggage connection times between international and domestic/regional, and to allow for further growth to domestic and regional operations. Integration will be undertaken in a staged manner, with the first major step of migrating domestic jets alongside international, on the cusp of PSE3 and PSE4. At 2022 this programme will have been successfully developed if it can accommodate the combined requirements of international and domestic jet passenger demand across all functions, whilst providing a good level of service and with reduced reliance on traditional processing relative to FY17.
Process for determining the need	The Masterplan set out that the Integrated Terminal is to be developed around the existing International Terminal Building ("**ITB**") with the majority of international expansion generally occurring to the north. Domestic capacity is provided to the south. It was considered that the proximity of the new domestic terminal to the ITB would facilitate more convenient transfers between sectors (both directions) than occurs today. It is believed that the reduction in minimum connection time and the elevation of the level of service for transfer passengers will represent significant commercial and service advantages to both the tenant / stakeholder airlines and Auckland Airport. The form, staging and timing of integration of domestic operations with international was a key focus of the TDP. The TDP review recommended a joined domestic processor, initially operating with a common landside facility (in Mode 2), but not precluding greater terminal integration (Mode 3 or 4) over time. The first stage is to move all jet operations for both domestic operators and is targeted to be delivered by FY22. Options for streamlining the journey between the terminals include a fixed connection/walkway or people mover between the new and existing facility. Domestic to international connections are a second stage project.
Consumer engagement	Auckland Airport consulted with airlines representing over 5% of revenues or represented by BARNZ. Throughout this document these substantial customers are referred to as the "airlines".
Alternative projects considered	Various timing, configuration and staging options have been explored for the nature and staging of integration. An un-joined domestic processor (operating in Mode 1) was excluded from the options because it would compromise the design principle of flexibility for future changes in operating environment. Moving one operator then the next was contemplated, but was not selected as the preferred option following customer feedback expressing a strong preference for both jet operators to move into the new facility at the same time. The base case option has limited common landside functions for domestic and international services. We will work together with the airlines to understand the pros and cons of greater common use over time. The range of options for the staged integration of the regional operation has yet to be fully explored. The feasibility design has determined the spatial requirement, but not the preferred timing of development of an integrated regional pier. Trade-offs exist between the benefits of a simple process unencumbered by the need to consider

	dependencies with jet operations (short processing journey) and the efficiencies and service level benefits of a single access point. Investment in the existing domestic facility will provide capacity and service to regional operations until such time as the regional pier is developed.
Constraints or contingency factors and risks	• The cost of integration is impacted by differential regulatory requirements for international, domestic hub and regional passengers. • The integrated terminal is a very extensive programme which faces standard risk around brownfields development and constructability issues. • A further issue to be worked through with domestic airlines is the optimal options for managing split operations whilst the existing DTB remains operational as a processing facility. Capital solutions may be required to manage this. • The success of the project is in part contingent on the alignment of the design assumptions with what the airlines have advised us of their plans.

1A International Terminal

Overall programme description

Description including aims and objectives	Increased demand, particularly during peak periods, is putting pressure on the level of service that can be delivered with existing international terminal infrastructure. At the same time, rapidly developing technology and the uptake of this technology by airlines and passengers is triggering a shift away from traditional models, such as check-in and other traditional terminal processes. The international terminal investment programme aims to: • Increase capacity and flexibility; • Optimise space utilisation; • Utilise the best available technology to improve passenger processing, experience, and more efficient use of the terminal footprint; • Relieve processing congestion, particularly through the Ministry of Primary Industries (MPI) arrivals screening process; • Resolve legacy infrastructure issues and associated operational constraints; • Provide new capacity and capability for international to international connections; • Ensure that the outbound baggage system is best-suited to the needs of future international outbound and connections processing; • Improve check in capacity and enable modernisation of check in process; • Improve intuitive wayfinding; and • Relocate operational facilities for ease of access and maintaining airport control. At 2022 this programme will have been successfully developed if it delivers additional capacity and flexibility which allows our airline partners and border agencies to operate effectively whilst providing a good passenger experience.
Key drivers	Capacity growth, passenger experience, level of service.
Alternative projects / options considered	Various timing, configuration, capital, operational and staging options may be available to address different elements of the international terminal programme. Depending on the efficient scale of development, there could be a different mix of elements than set out in the base case or different locations for stand growth. The prime example for this project is the efficient staging of the wedge and therefore the composition of each stage.

Constraints or contingency factors and risks	• Projects and sub-projects will have varying degrees of interdependencies meaning that any disruptions may have a flow-on impact, including potential impacts on other programmes, including the construction of the domestic processor. • Ensuring sufficient headroom to support continuing operations throughout construction.

Projects and potential sub-projects

1A.1 Check in, outbound baggage and landside dwell	
Description including aims and objectives	This landside programme focusses on the reconfiguration of the existing international terminal to create capacity headroom for check-in, outbound baggage and landside dwell. A key aim is to address the current constraint on the building by increasing depth of the building and unifying its façade and providing a good level of service. With increasing security concerns internationally Auckland Airport's strategy involves greater dispersal of the check-in function across multiple locations. The check-in strategy also involves greater use of technology solutions. PSE3 base case sub-projects are: • Increased development of Common Use Check In Facilities & Baggage System Development (BD-059) • NW17 Checkin & Departures Resilience (BD-007) • Back of House Baggage Screening (AF-046) • Out of gauge Outbound Baggage Solution (BD-056) • Relocation of INT check-in into ex-MPI area, including a cost efficient early bag store solution (ITB7) Construction of the new terminal façade will begin in PSE3, but be completed in PSE4.
Process for determining the need	The TDP Feasibility study analysed capacity and forecast requirements based on DKMA forecasts, Optimum Level of Service using 30th Busy Hour forecasts, assuming integration of the domestic and international demand. Faster throughout was forecast as a result of anticipated technological and / or procedural improvements and efficiencies.
Consumer engagement	Airlines were engaged through the TDP Feasibility and later provided feedback on optimised staging of projects through the price consultation process.
Alternative projects considered	Complete separation of the domestic and international landside functions was considered but discarded as an option. The intention is for integrated check-in to grow into the MPI area (once this has been expanded and relocated). Alternatives still exist regarding the extent of the expansion. The expansion of the baggage system will occur both as part of this programme and the future wedge. There is an interdependency with this programme, because of its geographical location.
Constraints, contingency factors and risks	• Amount of required check in headroom may depend on uptake of kiosk technology and approach to common use check in zones as well as remote check in. • Check in level of service will also be contingent on the delivery of capacity across other projects. For example check in solutions are also contemplated in the Plaza and Multi-storey carpark projects. • Delivery of the programme has an interdependency with the new domestic jet facility.

1A.2 Airside emigration and dwell	
Description including aims and objectives	This programme aims to deliver capacity for functions co-located airside, predominantly airside emigration and dwell. A key strategy is to centre dwell at the base of piers to avoid the need for gate lounge expansion. It is targeted that on opening day it will provide a level of service of B or degrading to C at peak by the end of its design life. An objective has been to work with Customs and Immigration NZ to faciliate their planned process changes and investment in technology solutions to extend the life of the facility beyond its planned design life of 2024. The aims of this programme will be mostly met through the next five years through the delivery of the current Phase 3 projects. Key aeronautical elements involve easterly expansion to accommodate expanded border processing; westerly expansion and infills of unused legacy voids and ramp areas, preparation and re-compose areas and VIP lounges. PSE3 base case sub-projects are: • Level 1 Departures Expansion (Phase 3) – ITB1 • Airside enabling for Wedge – A7 • Emperor Lounge Relocation ITB – BD-061 In PSE4, staged delivery of a wedge shaped extension airside between Pier A and Pier B is contemplated which will increase baggage and dwell. Stage 1 is forecast for FY23, stage 2 for FY27.
Process for determining the need	The 2014 Core Capacity Study examined the best location for the new emigration facility and the consequential effect on dwell. The TDP concept design phase built on this and iterated through consultation.
Consumer engagement	A series of consultations occurred through 2015 with airlines and border agencies on the project. Airline support was achieved for the final design of ITB1. Airlines were engaged through the TDP Feasibility and later provided feedback on the wedge.
Alternative projects considered	East, west and centre location projects were considered. The western and central developments were de-prioritised. A mini-wedge was optimised from the initial Level 1 project.
Constraints, contingency factors / risks	Enabling this development requires a number of existing tenants to be relocated. The development is alongside an operational space and a building structure from the 1970s. This complicates the development.

1A.3 Arrivals programme	
Description including aims and objectives	This programme is aimed at providing a consistent journey time for the end to end arrivals process through the three key facilities of immigration, baggage reclaim and MPI clearance as well as the interface with the landside meeters and greeters and dispersal to transport facilities. Improving the ambience of arrivals is also a goal. PSE3 base case sub-projects are: • Arrivals Expansion – stage 1 (ITB3.1) and subsequent joining with the existing terminal delivered as part of the ITB7 project • Refurbishment of the International Terminal Customer Facing Facilities (BD-058) • Relocation of Ground Transport functions from the north end and inner kerb (L1.1) which is triggered by the arrivals project The base case also schedules to start but not complete the Northern Bag Reclaim Expansion (3 belts) (ITB3.2) and potentially move the fire control building near Pier B (L1.2) which is in the way of the development path.

	We note that BD-058 supports both the arrivals programme and the check-in expansion programme.
Process for determining the need	The TDP Feasibility study analysed capacity and forecast requirements based on DKMA peak hour forecasts. Options were examined to deliver capacity in order to relieve queuing congestions for MPI processing and consider the implications of increased smart gate processing times at the primary line, with consequential effects on the show up profile at bag reclaim.
Consumer engagement	Airlines were engaged through the TDP Feasibility and then provided feedback on optimised staging of projects through the price consultation process.
Alternative projects considered	Alternatives were considered between a full development or a staged solution. The staged solution was selected which allowed the existing MPI to be decanted into a new area, avoiding the challenges of development alongside an operational area. Different geographical location options were considered for the bag reclaim. We also considered deferring building extra reclaim capacity, but this would create operational pressure and adversely impact the passenger experience.
Constraints or contingency factors	• The baggage reclaim system is a constraint on the outbound baggage system because international check is likely to need to expand north-west over time into the existing reclaim area. • Changes to baggage tracing requirements may impact on the investment required for the baggage system. • Changes to bag screening by MPI will affect infrastructure requirements.

1A.4 Pier and connections	
Description including aims and objectives	This programme is aimed at providing a balanced level of service across airbridge and bus serviced lounges and appropriate points for transferring international services. PSE3 sub-projects include: • Pier B Gates 17 and 18 (A1) • Pier A Reconfig and Stands 1/3/5 (ITB6) • Pier B Gate 19 extension and aerobridge connection (ITB4) • Minor terminal projects (ASB-1 and BD – 054) In PSE4 we aim to provide further contact stands to meet growing demand.
Process for determining the need	The TDP Feasibility study analysed capacity and forecast requirements based on DKMA peak hour forecasts and forecast stand requirements for assumed levels of bussing vs contact stands. An acceleration of Code E, F and C aircraft growth in 2015, together with airline requests triggered a feasibility study for the expansion of Pier B.
Consumer engagement	Airlines were engaged through the TDP Feasibility and then provided feedback on preferred levels of bussing and Pier A development options. More detailed consultation occurred regarding the design of the expanded Pier B.
Alternative projects considered	A range of design options were considered for Pier B. For Pier A development options sought to minimise the effect of pier development on the airfield operation.
Constraints / contingency factors / risks	The airfield operation is a constraint to pier development. There is an interdependency between bus lounge capacity and the ability to use remote stands for services.

	The effectiveness of the transfer product is not just reliant on spatial solutions but will also need to explore opportunities for process and technology changes and peak spreading.

1A.5 Ground Transport Centre / Plaza – Aeronautical Elements	
Description including aims and objectives	This programme will provide passenger dwell and protected transition routes landside between the multi-storey carpark and Novotel with connections to and from the terminal, as well as incremental check-in and bag drop capacity. The aim of this programme is to develop a ground transport and plaza area that will provide a unique NZ experience that informs the first and last external impressions of Auckland Airport and New Zealand. The area should facilitate and improve passenger journeys, whilst also offering transport and commercial opportunities. Aeronautical elements of this programme will be designed in PSE3 with a view to commissioning forecourt and plaza improvements (L2.3) in PSE4 and aeronautical functions to be provided within the carpark (primarily check-in and bag-drop) targeted for delivery on the cusp of PSE3 and PSE4 (L2.1).
Process for determining need	During PSE2 Auckland Airport has discussed the check-in strategy with the airlines and feedback was received on kerbside check-in, this lead to the concept of check in within car-parking facilities. The events associated with check-in at Brussels Airport has influenced the strategy to disperse landside functions to reduce mass gatherings of individuals. The ground transport / plaza area provides a further check-in bag drop area.
Consumer engagement	This concept was discussed during the TDP consultation in 2016.
Alternative projects considered	It is currently proposed that check-in be provisioned within the multi-storey carpark. Trade-offs may be made regarding the capacity provided within the carpark, or other areas of the ground transport centre. Whilst not in the capital plan, the design is to consider the addition of office space for a Joint Operations Centre or crew reporting facility, either adjacent to the carpark in separate building, or on the top floor of the carpark.
Constraints or contingency factors / risks	The development of the plaza requires the completion of a carpark (to replace carparking capacity lost through the development of the plaza and has some interdependency with the completion of enabling works for the arrivals area (L1.1).

1B Domestic Jet Facility

Description including aims and objectives	The domestic jet facility will primarily allow domestic jet passengers to be processed in a new facility adjacent to the existing international terminal. It will have common landside functions (e.g. check in capacity) and dedicated airside functions including security processing airside dwell and connectivity to the airfield via lounges and airbridges plus bussing. The objectives are to provide a staged pathway towards an integrated facility. In the first instance, the domestic jet facility will reduce connection times for passengers between domestic jet and international services. It will also provide opportunity for increased common use across the facility (particularly check-in) and potentially enable international swing operations on the airfield (delivered by bus). Integration will be undertaken in a staged manner, with domestic jets to move first, on the cusp of PSE3 and PSE4. PSE3 sub-projects include: • Enabling & displacement projects (A4.1): Relocation of existing functions to clear the site for development of the domestic processor and Pier A1 and related aprons and taxilanes • Domestic Processor — Adjacent Option Stage 1 – (DTB1): Comprising three structures – **Building 1**: check in, baggage reclaim, bridge to ground transport centre, security screening lanes. **Building 2**: with new baggage system, vertical circulation, airline lounge and, level 1 link between Building 1 and Pier A1 for departing and arriving passengers and **Pier A1,** including bus lounge, departures dwell and boarding areas, 12 airbridges and walk out access to 2 stands. In PSE4 we aim to further increase the integration of the domestic jet facility by construction of a departures boulevard adjacent to the international departure lounge and north of the east bag hall linking to Pier A1 including D-I transfer point. (DTB2) and will begin enabling the growth for regional around the western end of the existing DTB (A14, BD-026). At FY22 this programme will have been successfully developed if domestic jet operations have been relocated around 30 June 2022.
Process for determining need	This was described earlier for the Integrated Terminal. During the TDP there was also discussion with airlines on their demand projects for FY22 and beyond. These were compared with the DKMA forecasts in order to test the proposed sizing versus airline forecast demand.
Consumer engagement	Affected airlines were engaged through the TDP and pricing process. The cost of this project has been excluded from prices and consultation will continue on the form and function of facility.
Alternative projects considered	Various timing, configuration and staging options have been explored for the nature and staging of integration. A separate domestic processor (operating in Mode 1) was excluded from the choices because it would compromise the design principle of flexibility for future changes in operating environment. Moving one operator then the next was contemplated, but was not selected as the preferred option following customer feedback. The functioning of the facility will depend on whether any changes are made that increase the area to operate in common use between domestic and international. The base case option limits this to landside services. We will work together with the airlines to understand the pros and cons of greater common use over time. The full range of options for the staged integration of the regional operation has yet to be explored. The feasibility design has determined the spatial requirement, but not the preferred timing of development of an integrated regional pier. Trade-offs exist between the benefits of a simple process unencumbered by the need to consider

	dependencies with jet operations (short processing journey) and the efficiencies and service level benefits of a single access point. During PSE3, there is an interdependency/trade-off between the level of reinvestment in the existing facility and the new facility. Investment in the existing facility will provide capacity and service to regional operations until such time as the regional pier is developed. Increased peak spreading could reduce the stand FY22 requirements.
Constraints or contingency factors and risks	The location for the new domestic processor is within a constrained operational area. Operations will be protected and retained as much as possible, such as outbound baggage makeup however some existing operations need to be relocated in advance of any construction commencing (e.g. livestock compound, aircraft waste facility, etc). Different regulatory requirements for different passengers is currently a constraint which has influenced the level of integration. Future operational models will be contingent on the ability of the airlines and airport to influence regulatory change over time. The operation will be affected by the delivery of the Airfield programme, in particular the construction of twelve fully serviced code C jet stands, two remote stands and associated apron and taxilane infrastructure to service new Pier A1 by the end of PSE3 and the dual taxilane east of Pier A1 which is scheduled for PSE4. There is a risk that the airlines could materially change their domestic strategies which could either increase or reduce peak demand relative to the planned facility provision.

2. Existing Domestic Terminal

Overall programme description

Description including aims and objectives	The current DTB is reaching capacity in a number of key areas. We have commenced a staged process to integrate domestic and international operations. This staged approach will have all domestic operations in the existing DTB until FY22. At this point the jet operations will move to the new facility at the end of PSE3, whilst the regional operation will remain at the existing DTB. A programme of works has been developed which aims to provide short-term solutions to address constraints, to ensure that service levels for domestic and regional operations are maintained, to allow for continuing growth (largely outside of peak) over the next five years, and to allow for the existing domestic facility to be used in PSE4 as a regional processor. In PSE3 the key project is a further extension of life of the existing DTB (DTB-001). Improvements will be sought in the following areas: • Check in capacity for both trunk and regional services; • Outbound Baggage Capacity and back of house make-up space; • Security capacity; • Dwell; • Gate capacity; • In-bound arrivals baggage reclaim capacity; and • Forecourt capacity and congestion. In PSE4 we plan a further investment in the existing DTB for regional services (A4.5). Through the period this programme will have been successful if the requirements identified with the airlines and prioritised within the budget are delivered, at the same time providing a good passenger experience. It is acknowledged that cost benefit trade-offs will need to occur due to the fact that a staged migration to an integrated facility is the long-term plan for this facility.
Process for determining the need	In 2015 a domestic terminal gap study was complete which identified the remaining opportunities to provide improved capacity of the terminal and airfield. The TDP Feasibility Study confirmed the timing and staging of a combined domestic and international terminal. It is planned to open in late FY22 for the jet aircraft and passengers of Air New Zealand and Jetstar. In turn this has determined that the priority for the existing domestic terminal is to manage for total demand through to FY22 and for regional services after FY22.
Consumer engagement	The domestic airlines have been directly involved in setting out priorities for the existing terminal over PSE3.
Alternative projects / options considered	As well as capital investment at the existing domestic site, alternative levers to meet demand include: • delivering solutions in other areas (e.g. examination of potential swing capability from international facilities including bussing to domestic stands for continued domestic growth); • changes in policy (e.g. management of peak demand through increased levels of slot co-ordination; or • trading off increased maintenance and operating costs over capital investment.
Constraints or contingency factors and risks	• The footprint, apron depth and location of fuel are key constraints to the growth of the existing facility. • Changes to airline strategy which have the effect of increasing aircraft types or demand over forecast prior to 2022 present a risk that could lead to lower levels of service.

	• Disruption and operational impacts associated with a capitally based investment solution. • There will be some minor impact on the existing DTB caused through construction of the new domestic terminal facility. • Delay to integrated facility or peak demand growth could force increasing interim investment in an aging facility.

3. Runway, Taxiway and Aprons

Overall programme description

Description including aims and objectives	The runway, taxiway and aprons programme aims to: • Increase capacity and flexibility of stands and provide for peak growth; • Increase operational efficiency; • Appropriate levels of service for contact and remote stands; • Relieve apron congestion, including through optimising airside traffic flow; • Replace and renew existing runway assets; • Investigate feasibility of a flexible contingent runway; and • Provide additional capacity through the development of the second runway (note statutory permissions are provided for in the AD&D planning programme) Key projects are grouped into: • Code F Taxiway, stands and aprons • Code C/E Taxiway, stands and aprons • Flexible contingent runway • Second runway At FY22 this programme will have been successfully developed if it can accommodate the combined requirements of international and domestic jets across contact and remote stands, recognising that a level of bussing remains efficient in peak.
Key drivers	Level of service, maintenance, resilience / flexibility, domestic integration, capacity growth.
Constraints or contingency factors and risks	• Across the programme, the material risk which stands out is the level of headroom required during construction. • Varying degrees of interdependencies between sub-projects means that any disruptions may have a flow-on impact, including potential impacts on the construction of the domestic processor and the timeframes for integration.

Projects and potential sub-projects

The draft runway, taxiway and apron programme involves the projects set out in the tables below. Where indicated, further details about the potential sub-projects within each project are provided on the following pages.

3.1 Taxiway, contact / remote stands and apron - Code – F	
Description including aims and objectives	Construction of new remote and contact stands, modifications and extensions to taxiway and taxilane infrastructure, and the construction of apron and associated infrastructure capable of servicing Code F aircraft. The programme aims to create new capacity to cater for total stand demand, respond to airline demand for additional contact stands, provide headroom to enable expansion of international terminal, whilst seeking to maximise the efficiency of the airside movements. Projects for delivery in PSE3 include: • Code F Taxiway, stands and aprons: ○ Improving airfield safety including meeting regulatory requirments: e.g. Scanning of the airfield – to meet new regulatory requirements (AF-051), Improving traffic safety - follow the Green System (AF-053), Guard Lights on Taxiways (AF-054) ○ Providing interim stand capacity and long term Code F Taxiways with dual Code F circulation: Mike to Taxiway Foxtrot (A5) and Extend Taxiways Lima

	and Mike to Pier B (A5.1) – which can also provide temporary remote capacity until such time as operations are North of Pier B; ○ Increasing stand capacity including through improving the level of service of existing stands: Pier B northern aprons and taxilane (A9); Conversion of Stand 78 from a parking bay to a fully serviced stand (within A3); Stands 80/81 relocated to permanent positions and 1st section of Taxiway Foxtrot Dual (A6); Stand 75 (A2) to be completed to provide stand capacity We aim to commence the expansion of stand capacity for Code F taxiways, stands and aprons through Pier C remote northern aprons and taxilane (A9a) in FY22, with this to be completed in PSE4. We also plan to straighten Taxiway Kilo and realign remote Stand 79 (within A3) in PSE4 in order to improve flows and to enable the construction of the wedge.
Process for determining the need	The TDP feasibility study involved forecasting of stand requirements for projected busy day demand and levels of service for contact and remote operations. Construction staging of terminal development has then informed the level of disruption to existing stands and therefore the necessary levels of stand investment.
Consumer engagement	Feedback has also been received from customers on the levels of service for contact stands (e.g. adjacent infratructure requirements) and services levels for contact vs bus operations in peak through both the TDP and pricing consultation processes.
Alternative options and projects considered	• Peak smoothing / scheduling changes • Increasing existing stand use across domestic and international stands through providing solutions for passengers to reach stands regardless of whether those stands are predominantly operated for domestic or international operations. Options include bussing and varying degrees of common use environments within the terminal for domestic and international customers (e.g. swing, modal change)
Constraints or contingency factors and risks	Options are constrained by: • Regulatory requirements and cost / benefit tradeoffs. • Airline schedule strategy and fleet choices. • Existing infrastructure including the location of fuel hydrants, pipes. • The level of disruption to existing operations during construction.

3.2 Taxiway, contact / remote stands and apron - Code B / C / E	
Description including aims and objectives	Construction of new remote and contact stands, modifications and extensions to taxiway and taxilane infrastructure, and the construction of apron and associated infrastructure capable of servicing Code C/E aircraft. The programme aims to create new capacity to cater for total stand demand, respond to airline demand for additional contact stands, provide headroom to enable expansion of the international terminal, whilst seeking to maximise the efficiency of the airside movements. Sub-projects for delivery in PSE3 include: • Reconfiguring stands 70-73 (A4.2). • Code C / E Stands, Taxiways and Aprons Eastern Apron Redevelopment (A8.1). Construction of a twelve fully serviced code C jet stands, two remote stands and associated apron and taxilane infrastructure to service new Pier A1. • Regional & Parking Stands (A4.4). Construction of up to six new regional stands. In PSE4 we plan to reconfigure and extend existing dual taxiways (Delta 1 and Delta 2) (A4.3) – located east of new Pier A1 with the aim to provide efficient peak period Pier A1 jet operations.

Process for determining the need	The TDP feasibility study involved forecasting of stand requirements for projected busy day demand and levels of service for contact and remote operations. Construction staging of terminal development has then informed the level of disruption to existing stands and therefore the necessary levels of stand investment. The primary focus for PSE3 is the migration of domestic jet operations to the new domestic facility adjacent to the international airfield. This requires the replacement of existing infrastructure plus provision for forecast growth. This was considered during the TDP.
Consumer engagement	Through the TDP airline feedback was received on airfield requirements as well as peak demand forecasts.
Alternative options and projects considered	• Peak smoothing / scheduling changes. • Deferral of domestic integration. • Increasing existing stand use across domestic and international stands through providing solutions for passengers to reach stands regardless of whether those stands are predominantly operated for domestic or international operations. Options include bussing and varying degrees of common use environments within the terminal for domestic and international customers (e.g swing, modal change).
Constraints or contingency factors and risks	Options are constrained by: • Site geography. • The location of fuel hydrants, pipes and the fuel tanks. • Regulatory requirements and cost / benefit tradeoffs. • Airline schedule strategy and fleet choices. • Existing infrastructure and services which will need to be relocated away from the development site.

3.3 Airfield Utilities	
Description including aims and objectives	The airfield utilities programme is aimed at providing efficient support infrastructure for airfield operations including re-fuelling / energising aircraft and groundhandler equipment. The programme includes maintenance of the fuel hydrant and development to meet forecast growth. Despite being on the airfield, fuel supply is considered an Aircraft and Freight service under the Airport Authorities Act and sits outside of Aeronautical Pricing Activities. PSE3 sub-projects are: • Asset Renewels - Fuel Network Compliance (UT-AF186 and BAU-Fuel) • Fuel Ring Main Project Through Precinct (UT-AF174) • Airside Electrical Vehicle Charging Centres (AF-043) • Ring main and hydrant from tip of Pier B to new western remote hardstand (UT-AF177) In PSE4 further extensions of the fuel main are required to provide capacity and resilience (UT-AF180).
Process for determining the need	The capital investment planning has been informed by the following studies: • A desktop review of previously identified projects and costs from Beca Group Limited, drawn from Master Planning, Development Plans, Asset Management Plans and these have been consolidated into an integrated Utilities Strategy. • The expert understanding and experience of consulting engineers for the cost benchmarking with further investigations or studies as required, to deliver high level verification.

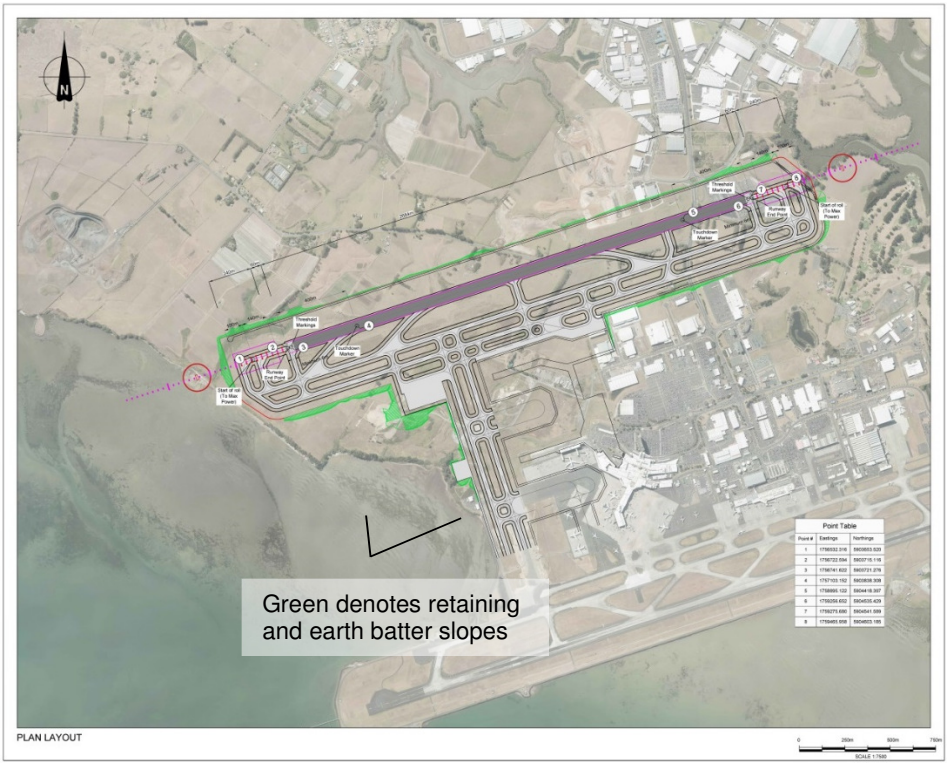
Consumer engagement	During consultation airlines have made known their airfield requirements for airfield fuelling. Generating a return on these assets is outside of standard charges and is instead delivered through our commercial arrangements with JUHI (within the Aircraft and freight segment).
Alternative projects / options considered	Choices exist as the location of fuel services and to what extent redundancy is provided by a ringmain.
Constraints or contingency factors and risks	Managing issues through construction and development, particularly of the terminal.

3.4 Flexible contingent runway – excluded from pricing due to uncertain cost and timing	
Description including aims and objectives	The flexible contingent runway project aims to provide the required infrastructure and operational systems to provide an immediate second runway option if the main runway is compromised in either the short term or long term (although the flexible contingent runway may have some operational limitations). Having the ability to convert Taxiway Alpha to a flexible contingent runway during night hours aims to provide an extended window for routine and extensive runway maintenance (including slab replacement using quick set concrete technology), as well as providing resilience in the event of an incident on the existing runway. This project has not been included in the forecast capital plan whilst we continue to explore all options and better define the costs and timing.
Process for determining the need	A construction feasibility sub-project commenced in March 2017 following feedback and high level support of the detailed safety case from the CAA in June 2016. The first stage of feasibility will focus on the specific concern identified by the CAA about a small non-compliant runway strip at the western end of Taxiway Alpha. The first stage will determine what would be required to establish full strip width at the western end of Taxiway Alpha including all considerations in relation to the consenting process, potential timings and costs. The outcome of this first stage study will impact the operational options. The second stage of the feasibility study will focus on the constructability of all other infrastructure requirements outlined in the system description in the safety case, ensuring that all the identified 121 mitigation measures are implemented. Feasibility will better inform the capital cost for this sub-project.
Consumer engagement	Stakeholder workshops were held over the course of 2015-2017 with airlines, BARNZ, Pilots Association, Airways and separately with CAA. Engagement will continue ahead of the determination of the optimal design. In price consultation it was agreed that because the optimal design was uncertain and that this materially affected its price, that the contingent runway was excluded from standard charges. The intention is to separately price this as a requested investment following further consultation on the design.
Alternative projects / options considered	• Runway closure and use of the existing contingent runway plan; • Extension of the existing maintenance window on the existing runway by adjusting the flight schedule; • Use of displaced thresholds on the main runway during periods of extended maintenance (as per Alpha One Alpha works); • Accelerating the development of the second runway; or • Different runway maintenance solutions
Constraints or contingency factors and risks	• The flexible contingent runway is limited to Code E aircraft and below. • Consent issues may arise if foreshore/harbour reclaim is required to achieve a fully compliant runway strip width.

	• Availability of quick set concrete resource in New Zealand.

3.5 Second Runway including Utilities	
Description including aims and objectives	The aim of this project is to deliver a step change in capacity and resilience through the development of a second runway. Through its involvement in statutory planning processes over PSE3, Auckland Airport is seeking to protect the existing operational rights of the southern runway and obtain approvals under the Resource Management Act 1991 ("**RMA**") for a second, long-haul capable runway. The aims and objectives of this project in PSE3 are to complete detailed design and commence earthworks for the second runway. The base case timing assumption is delivery of the first stage of the second runway by 2028. This timing is subject to further evaluation and will be reconsidered ahead of the decision to move from design to construction.

Process for determining the need	Auckland Airport has previously commissioned runway timing analysis which showed that the second runway would need to be operational in approximately 2025. This analysis was based upon existing aircraft separation distances and an assumed level of acceptable delay.
	Analysis undertaken during the development of the Masterplan identified that modification of air traffic control procedures to reduce aircraft separation requirements could provide an effective increase in the capacity of the existing runway, indicating that the existing runway could potentially accommodate peak hour aircraft movements beyond 2025.
	Arup was commissioned to refresh the estimate of the second runway timing based on capacity modelling of the existing runway and the DKMA peak forecasts finalised in Jan 2017. Key findings were that:
	• At 2017, delays are projected to be within benchmark levels;
	• At 2022, delays are projected to exceed benchmark levels which indicates that Airways new traffic management systems and procedures need to be accelerated;
	• Assuming the Airways traffic management system is deployed:
	  ○ At 2027, delays are projected to marginally exceed benchmark levels; and
	  ○ At 2032, delays are projected to significantly exceed benchmark levels.
	• As happens in other airports, this signals that growth in peak will be limited from 2027.
	Overall Arup advised that, based on the information available today and expected productivity improvements over time, the existing runway will be at effective capacity around the year 2027 and recommended that Auckland Airport plans to commission the second runway by 2028.
	Arup advised that the timing can be affected by: opportunities to make some further small capacity improvements (eg improved rapid exit taxiway layouts etc); sustained growth below the base forecast; and/or managing domestic growth in particular through up gauging of aircraft.
	In Arup's experience, runways typically take around 10 years to plan and construct depending on the complexity of the approval requirements and ground conditions / construction. This indicates that Auckland Airport should continue its planning and commence further early design. This will also assist in providing greater certainty on the constructability issues of extending a live runway.
	The base cost estimate has adopted the most recent staging alternative recommended by Arup and costed by Beca in early 2016. This cost estimate has been prepared based on inception level information and represents an initial very

	high level estimate only. We expect that the level of accuracy around these numbers will be refined as the feasibility and design stages progress over PSE3.
Consumer engagement	Most airline engagement through the pricing consultation process has focussed on the fact that Auckland Airport is currently operating at high levels of runway utilisation at peak times and that when demand reaches the point that a second runway is required, this will trigger a large step change in investment. Price consultation focussed on the appropriateness of signalling the impact of today's demand in bringing forward the need for a second runway. Auckland Airport has shared the Arup findings and base case cost estimates of the second runway with airlines as part of the aeronautical consultation process. The capital costs of the second runway have not been included in Standard Charges. We have been clear with our customers that, as well as investing in design and potentially construction in PSE3, Auckland Airport will seek to secure statutory planning permissions and is participating in the Airfield Capacity Enhancement working group (comprising Airways and Airlines) to seek southern runway and airspace efficiencies. We have been clear that the specific design, option and timing of the second runway remains a matter for capital consultation during PSE3. The base case cost estimates will also be refined at this time. As such, the base case development scenario and associated cost estimate should be treated as indicative only and will be updated following the ongoing programme of feasibility and design work as well as consultation with our substantial airline customers.
Alternative projects / options considered	As part of the Notice of Requirement process, Auckland Airport has undertaken a comprehensive assessment of alternatives to assess ten potential options for the second runway. These options were assessed against a range of operational, commercial and environmental assessment criteria. The findings of the assessment of alternatives has been discussed with airlines, Airways and BARNZ with support given to the preferred option (illustrated below), for which planning permission is being sought (via the Notice of Requirement). 

	The preferred option provides a runway with a Take-Off Runway Available ("**TORA**") of 2,983m, is located entirely on Auckland Airport land and avoids coastal reclamation. This preferred length provides the optimal practical capacity for the airport's future runway system, and is suitable for nearly all long-haul flights. A constructability study will be carried out to understand the feasibility of constructing the runway in stages. No decisions have been made at this point about the length and possible staging of the second runway, but the assumptions set out in this document have been built around an initial stage runway followed by a final stage runway. This is considered a conservative approach, which will be tested through the design and consultation process, including through consultation with airline customers. Building a full-length runway in one stage remains a possible option. We propose to complete concept design to improve our understanding of the costs and benefits of options over the course of PSE3, in consultation with our customers. This 10 year capex plan includes only the costs of the first stage of the runway.
Constraints or contingency factors and risks	Constraints on the second runway include: • Obtaining planning permission for the preferred option (at ultimate length of 2,983m TORA), including litigation risk following the decision-making process. • Constructability (geotechnical constraints, earthworks methodology). • Cultural sensitivities associated with construction. • Effectively managing the capacity of the southern runway, ahead of commissioning the second runway (contingent on operational improvements and/or implementation of new systems by Airlines and Airways), particularly a target of 48 sustained movements by 2022. • Road systems and transport plans.

4. Support Facilities

Overall programme description

Description including aims and objectives	The projects and sub-projects that fall under this programme relate to those services and facilities that support aeronautical development, delivery and performance. In particular, investment in technology is a crucial aspect of the support facilities programme. Technology is a key enabler in transforming airport operations and customer engagement (globally), and continues to influence customer expectations and demands. Reflecting this, the high level aims and objectives of the support facilities programme include: • targeting technology solutions that support innovation and efficiency through adoption of existing and emerging technologies for data driven decision making, increased efficiency of aeronautical assets; and to personalise and simplify the passenger experience; • meeting statutory planning requirements and managing the potential adverse effects of aviation on neighbouring communities; and • network level investments that support the broader capital programme (e.g. mastergrading, sustainability, transport and minor roading projects, project management office systems and campus wide construction).
Key drivers	Capacity growth/ driving efficiency of existing infrastructure, maintenance, service and performance levels.
Alternative projects / options considered	Increased maintenance and operating costs balanced with capex replacement.
Constraints or contingency factors and risks	Pace of technology advancement and adoption, some dependencies on the speed of airline adoption / take up of new standards and technologies, some dependencies on working with border agencies to enable technology-driven change.

Projects and potential sub-projects

4.1 Business technology	
Description including aims and objectives	This project involves the creation of an information technology network / series of roadmaps with common unified passenger and baggage data capture. This aims to provide controlled access across the terminal, improving security monitoring, increasing inbound and outbound processing capacity, and improving the passenger experience (including self-service and the use of biometrics throughout the passenger journey). There are four technology roadmaps, covering Operations, Customers, Assets, and Technology Enablement. By way of example, some key elements within the Operations roadmap include: • In conjunction with the Joint Border Agencies, Regulatory Authorities and the airline community, Auckand Airport has embarked on a collaborative effort to review and scope the future passenger's journey; • CCTV transformation sub-project to replace aging assets, provide better efficiency and security capability, and reduce business risk; • Support for self service check in and automated bag drops for improved customer experience and better asset utilisation; and • Additional Airport Collaborative Decision Making (A-CDM) initiatives focusing on two areas: under the wing activities (catering, refueling, cleaning, baggage) and in-terminal activities. Taken together, the business technology roadmaps will address the end-to-end customer journey, and have the potential to provide increased throughput and create more efficient use of capacity and space, reduce operating costs, and

	provide the necessary controls for integration, common use, and other operational flexibilties (e.g. swing gates).
Process for determining need	Project briefs are created by the business to serve as the mandate to engage scoping resources. Technology is an enabler of business outcomes but is not necessarily always the best solution to a given business problem. The problem may be a business process issue that can be fixed with some process re-engineering without the introduction of additional technology. Assuming that technology enablement is the best solution option, for each sub-project both functional and non functional business requirements are gathered. An assessment is then made against what technical system capability already exists that could be extended to cater for the business need. If the business requirement results in net new capability being required, a formal procurement process is undertaken and a range of Commercial off the shelf (COTS) software solutions are considered and are evaluated against the business requirements. A 5 year Total Cost of Ownership model is typically considered combining the up front capex outlay and ongoing operating model expenses.
Consumer engagement	During pricing a high level overview was provided of the cost of the business technology programme.
Alternative projects / options considered	The intention of the project is to "do more with less" – i.e. use technology to drive more efficiency in the existing footprint and enable the processing of additional volume while mitigating the need for infrastructure expansion. The main alternative to greater use of technology and automation is higher operating costs through manual process interventions and associated increasing staffing or increased footprint.
Constraints or contingency factors and risks	• Pace of technology advancement and adoption (faster/slower than expected). • Inter-relationship with terminal development plan. • Some dependencies on the speed of airline adoption / take-up of new technology and standards (eg CUSS 1.3). • Insufficient investment in redundancy reduces resilience • Dependencies on working with border agencies to achieve regulatory change and enable technology developments, including agencies' wider resourcing constraints.

4.2 Acoustic mitigation	
Description including aims and objectives	The Airport's current Designation 1100 requires that before any affected property falls within the annual aircraft noise contour, the Airport is required to make an offer to the land-owner to install acoustic treatment and related ventilation measures to achieve an internal acoustic environment of 45 dBALdn. (AF-048)
Process for determining need	Legal obligation under Auckland Airport's Designation 1100.
Consumer engagement	Auckland Airport makes an annual offer to affected landowners within the annual aircraft noise contour, which is open for 12 months. As part of the offer process, Auckland Airport holds public information sessions, which provide the opportunity for property owners to meet with Auckland Airport representatives to discuss the acoustic mitigation package. Details of the noise mitigation offer were discussed with airlines represented by BARNZ prior to the offer being made. The costs of acoustic treatment were included in the pricing capital plan consistent with requests following price setting in PSE2.

Alternative projects / options considered	Management has recently reviewed the effectiveness of the existing noise mitigation programme. The review explored the costs and benefits of a range of technical systems as potential replacements for the original packages. This work was supported by an acoustic review that evaluated changes in opinion and acoustic practices since 2001. The review has resulted in the development of revised packages that include a kitchen extraction fan and a wall-mounted, reverse-cycle heat pump and a balanced-pressure heat-recovery system that together provide more comfortable internal temperatures during summer and winter and deliver energy savings for homeowners.
Constraints or contingency factors and risks	As aircraft movements increase, affected landowners will experience a greater level of noise. Therefore, if homes are not treated, there is a risk of increased noise exposure and in turn may give rise to increased complaints, which could adversely affect Auckland Airport's current operations and future development. The package is conditional upon property owners accepting the offer to install acoustic treatment and related ventilation measures.

4.3 Airport Development & Delivery – support projects	
Description including aims and objectives	A range of initiatives are required to plan and manage capital delivery. Whilst they are not all strictly interdependent the overall budget allocation is managed at a portfolio level and involves: • Statutory planning processes. The largest planned item is the Notice of Requirement to secure statutory planning and noise contour protection for the second runway. This would modify the existing airport designation to allow the construction of a longer runway (2,983m), 72m north of the currently permitted location and to permit the creation of noise from the second runway. • Network level studies which are key enablers of capital projects. For example an Airfield Master-grading study and sustainability studies. • Transport planning and minor roading sub-projects (not included in Surface Access Budgets) to support minor optimisation/ improvements • Investment to increase the capacity of our project management office systems, processes and facilities to support the complex capital plan and growing support team commensurate with the outlined programme; including construction health and safety; Asset and Buildings Information Management and GIS service improvements; and • Campus wide construction support (applicable to multiple sub-projects) necessary to efficiently execute construction activity in an operational environment, e.g. haul roads, security systems, laydown and construction villages etc. (BD-046)
Process for determining the need	Capital estimates have been informed by analysis of historical requirements and forecasting of future requirements for known changes.
Consumer engagement	During pricing a high level overview was provided of the cost of the AD&D programme.
Alternative projects / options considered	Decentralised statutory planning, transport planning activities and project studies, with project-by-project delivery.
Constraints or contingency factors and risks	Elements of the programme are responsive to planning decisions by parties other than Auckland Airport and cannot be perfectly predicted.

4.4 Airport Emergency Services	
Description including aims and objectives	This programme provides the capital investment requirements necessary for Auckland Airport to continue to meet Civil Aviation Authority fire-fighting regulations, including enabling personnel to meet core fire-fighting competencies. PSE3 priorities are the replacement of vehicles and the existing simulator facility on Wiroa Island as it is important that Auckland Airport provides realistic hot fire training drills commensurate with the types of aircraft using the aerodrome. The existing facility has been in operation for over 10 years and is no longer suitable to adequately cater for AES training requirements. Asset management planning also indicated the requirement to replace some AES vehicles over PSE4.
Process for determining need	The need was identified as a safety and compliance priority per CAA Part139 and a review of best practice alternatives.
Alternative projects / options considered	The primary alternative examined was to utilise the training programmes and facilities offered by other providers – most likely to be Changi Airport in Singapore or Air Services Australia. This was deprioritised owing to higher total costs over the medium term and fewer benefits. If a facility is not maintained in New Zealand it would also be unavailable to other airports for training. A risk with training overseas is uncertainty that offshore facilities will always meet our specific training needs.
Constraints or contingency factors and risks	No specific constraints, contingencies or risks identified with the preferred onsite development.

4.5 Marketing (Customer Service) and Communications	
Description including aims and objectives	Capital expenditure is planned for the continued development and roll-out of communications infrastructure to measure and improve passenger experience throughout the terminals (MRK-01). This involves systems to measure customer satisfaction within the terminals and provide information that makes the customer journey easier and more predictable. As well as enabling communications infrastructure (UT-COMM200-204).
Process for determining the need	It was determined that we need a framework for measuring customer feedback. Until recently we have been heavily reliant on the ASQ quarterly surveying (which has the benefit of providing rankings relative to global benchmarks). However it was determined that tools were required that could provide greater levels of granularity that could deliver dynamic customer feedback that could be responded to immediately. Insights from our customer feedback framework are used to help decision making for both capital and operational improvements and priorities. Customer research has identified the need for investments in technology to provide customers better insight into traditional pain points and how to manage their time more effectively. Examples include travel times to and from the airport, queue times through processing and baggage collection. Research has also identified the need for customers to engage with the airport and have their issues resolved through multiple channels. Allowance has been made for the design and testing of advanced customer relationship management tools to support customer queries in multiple languages through websites, mobile devices, social media, texting and other such channels. These initiatives align with global trends for improving airport customer experience.

	Enabling communications infrastructure requirements were determined from the Utilities Strategy.
Alternative projects / options considered	As initiatives are rolled out a staged low cost and scaleable technologies are preferred over labour intensive solutions. For example the airport's approach to new technology is to rollout "minimum viable products" in the first instance then learn from customer interactions before refining future requirements.
Constraints or contingency factors and risks	The primary constraint is the complexity of legacy systems which may require integration.

4.6 Corporate	
Description including aims and objectives	Corporate capital expenditure is the regulated share of company-wide projects that support the entire business operation. It represents capital expenditure in systems for Finance, Procurement, Human Resources (including Payroll) and Health & Safety. Specific examples of the types of projects included within this category include deployment of a Contract Management System (Procurement) and a Permit to Work System (Health & Safety).
Process for determining the need	Investment is required in these areas for a number of reasons, including changes in work place legislation requiring system changes to ensure compliance, continuous improvement to existing systems to enhance internal controls and drive efficiency, and replacement of existing systems which have reached the end of their operational life and are no longer supported.
Alternative projects / options considered	Typically trade-offs are considered between increased operating costs balanced with capex replacement and the whole of life costs of different possible vendors / solutions.
Constraints or contingency factors and risks	Again legacy systems can be a constraint.

5. Airport Campus Utilities

Overall programme description

Description including aims and objectives	Our utility networks together provide the required levels of service to Auckland Airport's customers and operations in an innovative, reliable, price-efficient, affordable and sustainable manner Upgrades and expansion to Auckland Airport's utilities networks are required to ensure sufficient resilience and levels of service, and to support aeronautical expansion and development. The utilities programme involves growth / development across these utilities networks. (Note that replacement of aging assets is included in the "Asset Maintenance" programme).
Key drivers	Supporting growth and development, maintaining levels of service.
Alternative projects / options considered	A number of options exist within the programme to ensure sufficient capacity and resilience, including asset productivity, sustainability initiatives, new/emerging technologies and alternative service sources. Options will continue to be tested and evaluated on an ongoing basis.
Constraints or contingency factors and risks	Balancing necessary short term resilience and performance factors with long-term / future proofing options, particularly in light of emerging technologies.

5.1 Stormwater	
Description including aims and objectives	The capital programme for the stormwater network focuses on developing additional interception sources for rainwater, as well as key areas including terminal roof space, taxiways, apron and the runway, with the goal of maintaining and improving resilience and handling demand particularly in extreme conditions. Key initiatives include optimised planning/design to resolve flooding risk issues to terminal building and surface access networks, through upgrades (UT-SW131,133) to be delivered in PSE3. We also plan to improve the handling of direct outfalls/discharge (UT-SW144) in PSE3, with it to be delivered in PSE4.
Process for determining need	The stormwater planning has been informed by: • A desktop review of previously identified projects and costs from Beca Group Limited, drawn from Master Planning, Development Plans, Asset Management Plans consolidated into an integrated Utilities Strategy. • Condition surveys for some of critical stormwater pipes followed by renewals analyses for water supply, wastewater and stormwater infrastructure based on material, age and condition. • The expert understanding and experience of consulting engineers for the cost benchmarking with further investigations or studies as required, to deliver high level verification.
Consumer engagement	During pricing a high level overview was provided of the cost of the stormwater programme.
Alternative projects / options considered	There are limited alternative options for aeronautical stormwater solutions, though stormwater harvesting is re-evaluated time to time. Trade offs can be made between new assets and replacement capex.
Constraints or contingency factors and risks	Managing issues through construction and development, particularly of the terminal.

5.2 Water and wastewater	
Description including aims and objectives	The primary focus for short-term investment to the water supply and wastewater networks is on capacity, ensuring no supply constraint to aeronautical facilities occurs. The secondary focus for both the water and wastewater networks is on resilience, delivering a programme of renewals across the aging infrastructure to maximise the performance and longevity over the life of the assets. Key initiatives include: • Extension of the network in the aeronautical (ITB North / DTB / Central) precincts; • Development of second potable water supply line from Watercare network to aeronautical precincts; • Develop ringmain network to support resilience in supply; • Wastewater treatment system (WWTS) for grey water demand in ITB; • Re-location of infrastructure (e.g. pump stations) as part of enabling works for future terminal development; and • General demand driven local network upgrades & replacements. Subprojects for PSE3 are UT-WS001, UT-WS151, UT-WS153,UT-WS154, UT-WS156, UT-WW141, UT-WW142 and UT-WW144-148. In PSE4 ongoing asset maintenance and upgrades are contemplated together with increasing the capacity of reservoirs (UT-WS157, UT-WW145 and UT WW-148-149).
Process for determining need	The water and wastewater priorities have been informed by: • A desktop review of previously identified projects and costs from Beca Group Limited, drawn from Master Planning, Development Plans, Asset Management Plans consolidated into an integrated Utilities Strategy • Condition surveys for some of the critical wastewater pipes followed by renewals analyses for water supply and wastewater infrastructure based on material, age and condition. • The expert understanding and experience of consulting engineers for the cost benchmarking with further investigations or studies as required, to deliver high level verification.
Consumer engagement	During pricing a high level overview was provided of the cost of the water and wastewater programme.
Alternative projects / options considered	Auckland Airport is evaluating the economics of on-site micro wastewater treatment facilities to offset infrastructure investment. This has the potential to offer an alternative method of delivering programme objectives but is unlikely to make a material difference to the quantum of the overall capital plan.
Constraints or contingency factors and risks	Managing issues through construction and development. Potential for unexpected issues when relocating legacy facilities.

5.3 Utilities - Power – LV and HV Power	
Description including aims and objectives	The incoming power supply is approaching capacity. Investment in new infrastructure is required to ensure that sufficient capacity and resilience is maintained. Short-term investment is focused on meeting growth driven by aeronautical infrastructure development and increasing passenger numbers. In particular, an additional High Voltage (HV) power cable (33kV) from Vector's Mangere substation and extra transformer located locally at the Power Centre Intake (PCI) are required to meet growth in power demand. Other key initiatives include development of the Low Voltage (LV) reticulation network to aeronautical precincts facilitating terminal development plans, and additional/replacement of backup generator supply and new power centres to support terminal growth plans. Relevant subprojects contemplated over the next five years are UT-ELE009, 006, 022, 002, 020, 007 and 029).
Process for determining the need	Utilities priorities have been informed by the following studies: • A desktop review of previously identified projects and costs from Beca Group Limited, drawn from Master Planning, Development Plans, Asset Management Plans consolidated into an integrated Utilities Strategy; and • The expert understanding and experience of consulting engineers for the cost benchmarking with further investigations or studies as required, to deliver high level verification.
Alternative projects / options considered	A review of emerging technology (grid-storage batteries) to facilitate demand management and load profile shifting is currently being undertaken. This may enable the deferral of investment in the HV supply (cable and transformer) and facilitate more modular investment in infrastructure with capacity more closely matching demand. This has the potential to offer an alternative method of delivering the programme objectives but is unlikely to make a material difference to the quantum of the overall capital plan.
Constraints or contingency factors and risks	Innovation / emerging technology, demand volatility.

6. Airport Surface Access Network

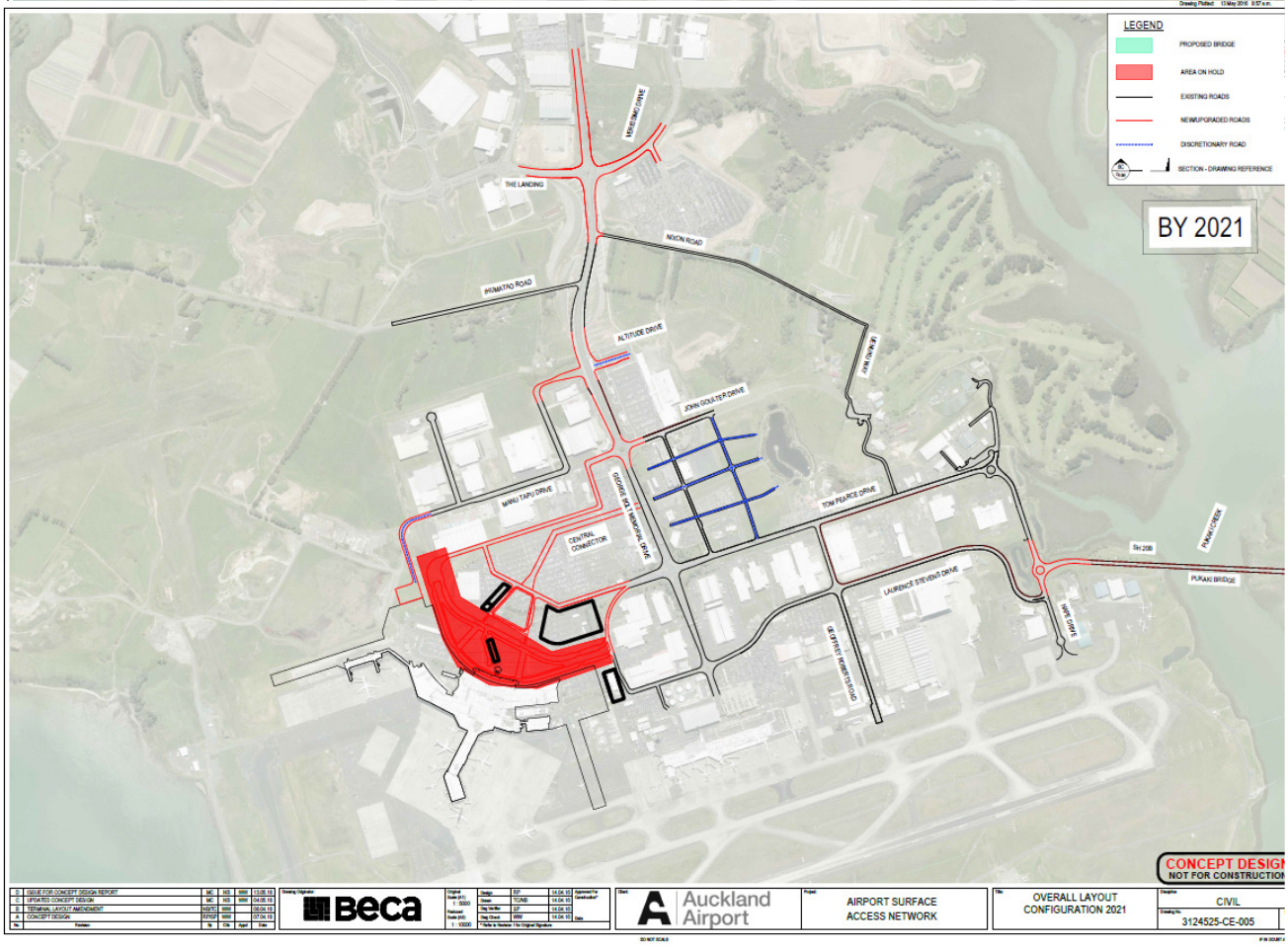
Overall programme description

Description including aims and objectives	The projects and sub-projects that fall under this programme relate to the capital investment to support the strategy for the airport surface access network, ground transport facilities, and other airport-related facilities. Effective land transport connections to and from the airport are essential. Auckland Airport is conscious that average travel times to and from the airport have increased and become less reliable, impacting on flight connections and customer experiences, as well as impacting on time sensitive / perishable air freight. Auckland Airport is also conscious that the construction traffic associated with the airport redevelopment will be significant, and despite the careful sequencing and timing of the redevelopment there is potential for disruption to traffic and transport around the airport precinct. The transport strategy and development programme will address these concerns and improve our overall transport network by: • Targeting a major shift in mode of travel through the development of a system of bus and high occupancy vehicle lanes transit lanes across the Precinct, to operate in conjunction with those across the wider region (developed by NZTA and AT); • Providing a sequence of major airport transport network improvements to increase arterial/terminal centric capacity while improving reliability/resiliency (through the provision alternate routes) also improving safety; and • Implementing demand management strategies to support the operation of the road network. The surface access network and ground transport investment outlook is informed by this strategy, and aims to develop sustainable infrastructure that: • ensures the basic safety, security and operational efficiency of Auckland Airport; • provides a reliable and easy to navigate journey to the airport; • alleviates capacity pinch points and supports increasing growth; and • supports stage-able and demand led aeronautical development. Auckland Airport looks forward to working with AT/NZTA as timing and details of their intended Rapid Transit Service (RTS) between the City and Airport become known. Auckland Airport understands that AT/NZTA's preferred RTS mode is currently a Light Rail Train (LRT) which uses a Dominion Road and SH20/20A route. As a consequence the Auckland Airport Transport Masterplan currently makes land provision for a LRT alignment, to accommodate access to the precinct from the North. Due to the forecast increase in bus services to and from the Airport, Auckland Airport is investing in bus and high occupancy vehicle lanes. Should the preferred RTS change then Auckland Airport will need to revisit its transport masterplan. Auckland Airport is also advocating to AT/NZTA that a rapid public transport service be developed between Puhinui Station and the Airport.
Key drivers	Capacity growth, passenger experience, level of service, resilience.
Alternative projects / options considered	For any given issue we will consider whether one or more strategic responses are required, at times a range of responses will be required and options evaluated including: • Infrastructure and network improvements (e.g. increasing intersection capacity and providing for some separation of airport and non-airport traffic, bearing in mind that Auckland Airport is also reliant on significant improvements to SH20A and SH20B – increased capacity on both state highways is vital);

	• Modal shift (credible rapid transit service and meaningful local services tailored to meet the needs of those who work at the airport, in collaboration with Auckland Transport and other public transport operators); and • Demand management (e.g. shifting the peaks in travel, utilising ride-share approaches to increase vehicle occupancy, working with transport and logistics operators, separating out through traffic from airport traffic).
Constraints or contingency factors and risks	The performance of the airport road network depends on decisions by the three road controlling authorities – AT, NZTA and Auckland Airport. Future access to the airport could be compromised by poor development - or by a mismatch between development and transport capacity. Auckland Airport is fully aware that a partnership approach to development is required, and recognises that effective partnerships with key public agencies and aligned investment decisions will be crucially important.

Auckland Airport commissioned a study in the first half of 2016 to better understand the next stage of developments to the Airport Surface Access Network ("**ASAN**"). These developments will be highly dependent on the preferred pathway for terminal and airport development going forward. We provide extracts of the ASAN with indicative staging below. We note that additional bus/high occupancy vehicle transit lanes have been announced beyond what is shown in these staging diagrams.

The following maps show the planned network as at 2016 and 2021:



The Airport Surface Access Network programme involves the projects set out in the tables below.

6.1 Terminal roads	
Description including aims and objectives	Development of the terminal precinct network to cater for growth, terminal, forecourt and carpark development and consistent journey times throughout the precinct. Upgrades to the existing network are required to improve access to the existing terminals and the integrated facility. PSE3 sub-projects are: • Terminal Exit Road (RD010a); • Terminal Loop Road; (RD010e) • Perimeter Road (RD-018); • Forecourt Roads (RD010C and D); • Central Connector (RD-011a); and • Terminal North Service Road (RD-009) PSE4 contemplates further staged development of the central connector. At FY22 this programme will have been successfully delivered if the resilience of the airport surface access system has been increased relative to 2017.
Process for determining the need	The Airport Surface Access Network study built upon the 2014 Masterplan to create a programme of transport projects out to 2044 to alleviate congestion, improve journey time reliability and encourage modal shift and demand management.
Consumer engagement	The programme of works was included as part of the airline price consultation.
Alternative projects / options considered	The development of terminal roads will be designed and where possible, staged to to drive higher productivity from existing assets. New infrastructure will be demand led and has strong interdependencies with the development of the Integrated Terminal. The plan is predicated on an at grade terminal forecourt road. An elevated road was considered during the Masterplan and was ruled out for a number of reasons including inflexibility for future change, and significant capital cost for marginal benefit compared to the at grade option.
Constraints or contingency factors and risks	Cost associated with displacing existing activites. Future transport-related disruptive innovation and unknown technologies. Uptake of public transport is lower than predicted. Delivery of forecourt roads will be constrained by delivery of façade terminal development projects and the multi storey car park.

6.2 Arterial and other roads	
Description including aims and objectives	Development of the broader airport surface access network to cater for growth and improved journey times. Upgrades to the existing network (including new roads, additional high priority lanes and pedestrian linkages). PSE3 sub-projects are: • Bus and high priority vehicle lanes on George Bolt Memorial Drive, Tom Pearce and Laurence Stevens Drives (RD037); • Intersection works and signalisation of Landing Drive, Manu Tapu and Altitude Drive West (RD001-3a); and • South Eastern access improvements and the commencement of Altitude Drive construction (RD-021a,d, RD-038).

	Altitude Drive is planned to complete in PSE4 (RD-015a) and be supported by further initiatives in the south east of the precinct around Tom Pearce (RD-020b,d and RD-021d)
Process for determining the need	The Airport Surface Access Network study built upon the 2014 Masterplan to create a programme of transport projects out to 2044 which alleviate congestion, improve journey time reliability and encourage modal shift and demand management.
Consumer engagement	The programme of works was included as part of the airline price consultation. Consultation with the New Zealand Transport Agency and Auckland Transport is on-going in respect to these projects.
Alternative projects / options considered	Options exist to repurpose other local roads to de-congest or provide alternatives to arterial roads for both through traffic and traffic destined for airport. Alternative timing will also be considered as further information is made available on network wide priorities.
Constraints or contingency factors and risks	Feeder arterial roads. Future transport-related disruptive innovation and unknown technologies. Uptake of public transport is lower than predicted. Initiatives by NZTA and AT will affect the programme and could present both risks and opportunities.

7. Asset Maintenance

Overall programme description

Description including aims and objectives	This programme replaces end of life equipment across the aeronautical campus. Sub-projects included within this include: slab replacement, airbridge refurbishment / replacement, overall building maintenance, fleet, utilities within the building and minor expansion and asset replacement.
Key drivers	Safety, security, compliance, asset maintenance, level of service, resilience.
Alternative projects / options considered	Changes to reliability levels, acceptable degradation, operating cost solutions.
Constraints or contingency factors and risks	Quality of lifecycle analysis, reliability of replacement solutions.

Projects and potential sub-projects

7.1 Runway slab replacement project and runway works	
Description including aims and objectives	This programme involves replacement or renewal of aging, deteriorating and damaged slabs (AF-056). There is an ongoing programme of maintenance to ensure continuous service provision and to maintain safety requirements.
Process for determining the need	• The investment required is informed by a yearly condition assessment which models trending pavement changes and provides a 10-year projected view of required replacement to runway, taxiway and taxilane concrete slabs. This modelling is used to inform which slabs will be replaced, and when the replacements will occur.
Consumer engagement	• This programme was included as part of the airline price consultation.
Alternative projects / options considered	• A combination of standard and rapid set concrete will be used to implement the required replacements over the next 5-10 years. • Balance between use of standard concrete and rapid set concrete, which is higher cost but is operational within 8 hours. • Alternatives considered over time is the optimal balance of increased maintenance costs against capex replacement to get best NPV outcome.
Constraints or contingency factors and risks	Works on runway are constrained by operational hours. The current window for maintenace is 1AM – 4AM on a Monday each week. Risks include weather issues causing delays to project and point damage not highlighted by condition assessment reports. The use of rapid set concrete instead of standard concrete may provide opportunities to reduce the time for runway works. This is still being evaluated.

7.2 Airbridge refurbishment	
Description including aims and objectives	This programme entails the onoging refurbishment of airbridges to maintain levels of service and the replacement of airbridges at the end of their lifecycle.
Process for determining the need	Routine maintenance schedules and condition assessment occur. The outputs of these determine the plan for asset replacement, renewal and safety improvements.
Alternative projects / options considered	Key options are full replacement, partial upgrade or increased maintenance.
Constraints or contingency factors and risks	As the assets become more highly utilised, time for maintenance becomes a constraint.

7.3 Aeronautical asset maintenance – Business as usual	
Description including aims and objectives	The aim of this programme is to ensure that property plant and equipment is maintained across the remainder of the aeronautical campus to meet safety and service requirements. Minor capital expenditure projects in this category include: • Ground Power Unit Purchases • Vehicle/Fleet Replacements • HVAC replacements • Lift/escalator replacements • Minor capital works – i.e. seasonal readiness, Health & Safety • Passport e-gates • Operational tools replacement & purchases • Re-lamping • Toilet refurbishment
Process for determining the need	Asset management plans establish sub-project priorities for the campus. An annual review process is undertaken to prioritise projects within budgeted maintenance capital expenditure provisions.
Alternative projects / options considered	A range of options could exist at a detailed level. In principle the team seek to understand the cost of increased maintenance with the cost of asset replacement, with a view to obtaining the best NPV outcome.
Constraints or contingency factors and risks	• Quality of lifecycle analysis • Reliability of replacement solutions.

Summary of costs and extent included in Aeronautical Pricing Activities

18(x): Forecast Capital Expenditure ($m)

	PSE3				
	Disclosure			Priced	
Capital Expenditure by Key Capital Expenditure Project	Capex (a)	Opening WIP (b)	Total (a) + (b)	Assets Commissioned (c)	Extent Priced (c)/(a+b)
International Terminal (Check in, Outbound Baggage & Landside Dwell)	166	–	166	166	100%
International Terminal (Airside Emigration & Dwell)	73	54	126	112	89%
International Terminal (Pier and Connections)	176	48	224	219	98%
International Terminal (Arrivals)	118	–	118	102	87%
Ground Transport Centre / Plaza - Aeronautical elements (Ground Transport Centre / Plaza - Aeronautical elements)	47	0	48	–	0%
Integrated Facility (Domestic Jet Facility (Phase 5))	630	3	633	56	9%
Existing Domestic Terminal (Extension of Life)	23	–	23	23	99%
Runway, Taxiway and Aprons (Code F Taxiway, Stands and Aprons)	202	5	207	165	80%
Runway, Taxiway and Aprons (Code B/C/E taxiway, stands and aprons (Phase 5))	247	–	247	247	100%
Runway, Taxiway and Aprons (Airfield Utilities)	34	–	34	–	0%
Runway, Taxiway and Aprons (Flexible contingent runway)	–	–	–	–	0%
Support Facilities (Business Technology)	22	–	22	22	97%
Support Facilities (Acoustic Mitigation)	9	–	9	9	100%
Support Facilities (AD&D Support Projects)	34	–	34	33	97%
Support Facilities (Airport Emergency Services)	11	1	12	12	100%
Support Facilities (Marketing Customer Service and Communications)	3	–	3	3	100%
Support Facilities (Corporate)	6	–	6	6	97%
Airport Campus Utilities (Utilities - Stormwater)	8	–	8	7	91%
Airport Campus Utilities (Utilities - Water & Wastewater)	17	0	17	17	100%
Airport Campus Utilities (Utilities - Power - LV and HV Power)	6	–	6	6	100%
Airport Surface Access Network (Terminal Roads)	34	0	34	34	100%
Airport Surface Access Network (Arterial and Other Roads)	80	2	82	39	47%
Asset Maintenance (Slab Replacement and Runway Works)	47	–	47	47	100%
Asset Maintenance (Airbridge Refurbishment)	8	–	8	8	100%
Asset Maintenance (Business as Usual)	61	–	61	61	99%
Second Runway incl Utilities (Second Runway incl Utilities)	270	1	271	–	0%
	–	–	–	–	0%
	–	–	–	–	0%
	–	–	–	–	0%
	–	–	–	–	0%
Other capital expenditure	18	26	43	23	54%
Total Capital Expenditure	2,353	139	2,492	1,418	57%