Whakatane Airport Master Plan

20 May 2008

Whakatane District Council

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Whakatane Airport Master Plan

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FOREWORD

"The master plan is a strategic planning tool to ensure the most effective and efficient development of the airport's land holdings and infrastructure over time.

The actual scope, staging and timing of airport development should be subject to continuous review and development should only be undertaken after having regard to the circumstances prevailing at the time, to airport policy, to detailed planning and to rigorous business case analysis.

The aviation industry is dynamic and as a consequence the joint venture partners' investment programme should need to be flexible, incremental and based on the benefits to the community shareholders commensurate with the risks involved.

The master plan is a living document and should be used to ensure the provision of the safe, secure movement of aircraft passengers and freight. The Airport Authority should continue to refine its long term strategy to ensure that the airport supports the growth and aviation capacity needs of the Eastern Bay of Plenty District. Within this framework it should plan and manage the expansion of the airport in a responsive, sustainable and secure manner. This strategy is focused on providing a strong platform for growth by implementing a range of key initiatives.

Ultimately the airport should have a 1950 metre runway with a starter extension at each end, providing a take-off run of 2210 metres on one runway and 2250 metres on another. It should have a safety zone of 800 metres at either end of the runway incorporating the required 300 metre runway-end safety area plus a 500 metre public safety zone. The airport should have a total of six aircraft aprons, a 12000m^2 passenger terminal and a public car parking capacity of 700 vehicles. It should provide an air traffic control service, rescue fire service and aviation security service. If sufficient demand eventuated prior to the redevelopment of the main terminal complex, the airport should have a 20 hectare terminal and business park complex situated at the north-western end of the property with a 2 kilometre access road off Aerodrome Road.

EXECUTIVE SUMMARY

The option with the greatest potential for the future growth and development of Whakatane Airport is a combined terminal and business park complex, linked to a runway of sufficient length to permit the design aircraft to operate without restriction within New Zealand and to the eastern seaboard cities of Australia.

This option can be achieved by developing a new terminal and business park complex on more than 20 hectares of land situated in the north-western sector of the airport - and by extending and strengthening the existing runway 450 metres to the east and 780 metres to the west. This would provide the length of take-off run necessary to operate the Boeing 737 800 design aircraft to Melbourne, Sydney and Brisbane.

The issues associated with this proposal are:

1. the need to extend the runway 300 metres beyond the airport western boundary requiring –
    - the 'stopping' of a 250 metre section of unformed legal road which runs parallel with the airports western boundary (an area of approximately 0.5 hectares) and the establishment of a new legal road (unformed) to the north of the runway strip
    - the need to acquire 7.5 hectares of private farmland measuring 300 metres in length and 250 metres in width which would extend the runway strip in a westerly direction
2. the construction of 2 kilometres of sealed access road from Aerodrome Road along the eastern boundary with the golf club then following the northern boundary of the runway strip to the proposed site. Utilities such as water, electricity and telephone would need to be similarly extended
3. levelling of the site to the same relative level as the runway strip would be required

However, establishing a new terminal and business park complex on the north-western site would be logistically more difficult and considerably more expensive than developing the existing site. It would be an unwarranted additional expense unless there is a significant 'known' demand for an airport business park. Until that demand is known the preference must be for redevelopment of the existing terminal complex.

Any major airport development will be many years away and there is adequate time to survey the market and establish whether a demand exists for an airport business park in this location. A concept plan and artists impression would be a useful to generate interest. If a large prospective tenant or group of tenants is found, a business case would determine whether the Airport Authority would receive sufficient revenue to justify the establishment costs.

Unless there is a strong business case for moving to the north-west site, it should remain where it is. It is imperative that both options remain open until the contracts are let for the development of one of the sites, which would be the point of no return.

Development of the existing complex can be progressive, an option which is not available on the new site. For example, a new high-strength apron could be developed alongside the existing aprons, where sufficient space is available to set a new apron back a further 20 metres from the runway centreline.

However, the existing site is less than 3 hectares – and a minimum of 5.8 hectares is required to develop the new terminal complex. The acquisition of 3.5 hectares adjoining the southern boundary of the existing terminal is essential for the redevelopment of the site. This does not include the land required for light aircraft hangars.

If a decision is made to develop the north-west terminal and business park complex the 3.5 hectares of land acquired for the re-development of the existing site would no longer be required. It may therefore be sufficient to designate the 3.5 hectares for future airport purposes, but not purchase the land until it is actually required.

Alternatively, the land could be purchased with a lease-back to the current owner until such time as the land is required or the owner elects to surrender the lease, whichever is the sooner. If the land is acquired using the provisions of the Public Works Act, the current land-owner would have the right to re-purchase the land in the event of it not being required for airport purposes.

Another 'key' strategy should be the encouragement of commercial light aircraft activity including pilot training and recreational flying. This would increase the profile of Whakatane Airport and generate much needed additional revenue from ground rents and landing charges.

The additional land required for the western runway extension should also be designated for airport purposes and all options considered for the eventual acquisition of the area.

There is an urgent need for a site on which to construct light aircraft hangars. The most suitable area is private land adjoining the western boundary of the existing terminal complex. Negotiations are currently in progress between a private developer and the landowner for the construction of the first stage of a proposed 44 hangars with direct access to the airport operational area. It will therefore be necessary for the Airport Authority to have discussions with the parties concerned and it is recommended that during these discussions the Authority seek to acquire the land either by lease or purchase. Hopefully an early resolution of this issue would allow earthworks to proceed and the first hangars to be available for use within six months.

There is also an urgent need for two commercial helicopter hangars. A site adjoining Aerodrome Road to the east of the existing terminal complex may be suitable, provided that the prospective tenants are able to design their hangars within the constraints of the site. Considerable cut and fill is required to prepare the site.

Selection of the existing terminal site as the preferred location for a new terminal complex will require that the lessees of Lots 1 to 5 be informed that upon expiry their leases will not be renewed, or may be terminated earlier if the land is required for airport development.

In the event of a new terminal and business park complex being developed on the north-western site, it is proposed that the existing terminal complex be utilised as a commercial light aircraft facility for aircraft of less than 5700 kilograms.

The establishment of an airport business park relies heavily on the Council's ability to offer prospective lessees an acceptable length of tenure. As the Council itself has a limited leasehold tenure of the airport land expiring in 2098, there is a need to clarify whether the Council has the ability to offer tenures of acceptable duration.

It is recommended –

- that the contents of this Plan be classified 'commercially sensitive' to protect the airports negotiating position and commercial advantage with regard to land acquisition and the business park concept.

- that this Plan be updated and reviewed every 5 years

1 BACKGROUND

1.1 PLANNING HORIZON

Airport planning is typically limited to a 10 to 30 year timeframe incorporating noise limits based on the forecast maximum number of aircraft movements reached during that period.

The forecast growth in airport activity is normally based on historic patterns of population growth and passenger numbers projected forward using low, medium and high growth scenarios. The limitation of this approach is that the residual capacity of the airport beyond that protected by the time-based planning horizon is vulnerable to the encroachment of incompatible land use activities. It is the encroachment of incompatible land uses which will ultimately prevent the realisation of the full potential of the airport to meet the communities increasing demand for air transport services.

Given that aerodromes are valuable regional and national infrastructural assets which are extremely expensive and difficult to replace, there is increasing concern that existing aerodromes are not being adequately protected against the encroachment of incompatible land use activities such as residential development. While Whakatane aerodrome has been in existence for more than 50 years it is not yet seriously compromised by the encroachment of residential development or other potentially restrictive land uses.

The growth in demand for air transport services at Whakatane Airport has not been as great as at Rotorua and Tauranga Airports due to the slower rate of population growth in the Eastern Bay of Plenty over the past 50 years.

The catchment population for Tauranga Airport has grown by 780% in the past 50 years[1] and the catchment for Rotorua Airport has grown by 460% during the same period. These compare with a 250% growth rate in the catchment population for Whakatane Airport.

As a consequence, any population or usage-based forecasts are likely to expose the residual capacity at Whakatane airport to a greater risk of encroachment of incompatible land use activities. If this occurs, when the demand eventuates the ability to meet that demand may already be compromised.

Tauranga and Rotorua Airports and numerous others throughout New Zealand are already suffering the consequences of inadequate protection against the encroachment of incompatible land use activities. The advantage of the slower growth rate in the Eastern Bay of Plenty during the past 50 years has been that there is still the opportunity to protect Whakatane Airport from being placed in a similar situation.

Airports are important economic drivers for the growth and development of any district or region. It is therefore essential that airport capacity be protected in order to meet the community's future demand for air transport services, whenever that demand may occur. In order to achieve this objective, this plan is based on airport capacity and not a time-restricted forecast. Similarly, the commencement of development activities are 'triggered' by specific events or requirements rather than projected dates or timelines

[1] Source: Statistics NZ population statistics for 50 year period ended 31 March 2006

1.2 DEMAND FOR AIRPORT SERVICES

The development of airport infrastructure is normally in response to a known or perceived demand. While demand may be predictable, such as the demand for domestic passenger services based on population growth trends, there are many other factors which influence demand which cannot be forecast with any reasonable degree of certainty.

These factors include airline economics and competition, public demand for air travel, the cost and perceived safety of air travel, changes in the size of the airport catchment area and the services on offer at neighbouring airports, public perception of the environmental impacts of air travel, the cost and convenience of alternative forms of travel, the effects of Government policy and statutory requirements, the relativity of the $NZ to other currencies, the development of new industries and businesses, changes in the popularity of New Zealand as a tourism destination, the unpredictability of 'growth spurts' in population growth, immigration policy and demand, the disposable income levels of sectors within the community, the availability and frequency of 'cheap' airfares, advances in technology which reduce the need to travel, world events – and so the list goes on. Demand forecasts are based on 'known' growth indicators, but the number of growth factors which cannot be forecast with any degree of certainty are so great that another approach is necessary when it comes to airport planning.

Population-based demand

The population statistics used in the following table were provided by Statistics NZ. They were collated from the 1956 and 2006 national population census and reflect the normally resident populations for Tauranga, Rotorua and Whakatane airport catchments.

The table shows the population growth in the respective airport catchments in the past 50 years, both as a number and as a percentage.

Airport Catchment Population Growth : 50 years (1956 - 2006)

Airport Catchment	Current TLA Districts	1956	2006	Increase	% growth
Tauranga Airport	Western Bay, Tauranga	18,853	147,100	128,247	780%
Whakatane Airport	Opotiki, Whakatane, Kawerau	20,248	49,000	28,752	242%
Rotorua Airport	Rotorua	14,507	69,000	54,493	476%
Total Bay of Plenty		53,608	265,100	211,492	495%

[Source: Statistics NZ]

The table indicates that the Eastern Bay of Plenty has experienced relatively slow growth in the past 50 years compared to the Western Bay and Rotorua sub-regions.

As the normally resident populations are generally regarded as the basis for the number of services provided to and from Auckland and Wellington, the following tables compare the number of seats and frequency of services provided by Air New Zealand to and from similarly-sized regions throughout the country.

Auckland

Airport	Airport Catchment (TLA's)	Airport Catchment Population	Return per day	Aircraft	Available seats	Total seats per day (one way)	Ratio Seats per 1000 population
Rotorua	Rotorua	69,000	5	190D	19	95	1.38
Timaru	Timaru, Mackenzie, Waimate	53,877	4	190D	19	76	1.41
Gisborne	Gisborne, Wairoa	52,947	6	190D	19	114	2.15
Whakatane	Whakatane, Opotiki, Kawerau	49,000	5	190D	19	95	1.94
Blenheim	Blenheim, Kaikoura	46,170	5	190D	19	95	2.06
Taupo	Taupo	32,421	3	190D	19	57	1.78

Wellington

Airport	Airport Catchment (TLA's)	Airport Catchment Population	Return per day	Aircraft	Available seats	Total seats per day (one way)	Ratio Seats per 1000 population
Rotorua	Rotorua	69,000	5	Dash Q300	50	250	3.62
Timaru	Timaru, Mackenzie, Waimate	53,877	4	190D	19	76	1.41
Gisborne	Gisborne, Wairoa	52,947	5	190D	19	95	1.79
Whakatane	Whakatane, Opotiki, Kawerau	49,000	0		0	0	0
Blenheim	Blenheim, Kaikoura	46,170	12	190D	19	228	4.96
Taupo	Taupo	32,421	5	190D	19	95	2.97
AVERAGE	(excluding Whakatane)	50,800	6.2			149	2.92

The above analysis shows that there are clearly factors other than population statistics which influence an airlines decision whether to provide a service and how many seats are provided on any particular route.

It also shows that the Eastern Bay of Plenty is the only district of its size which does not have a minimum of four direct daily services to and from Wellington. Air New Zealand's claim that there is insufficient demand to justify a regular service to and from Wellington is not consistent with the evidence.

Following recent representations by the Whakatane District Council, Air New Zealand has agreed to a trial once-daily service to and from Wellington. On the basis of the above analysis there should be 5 direct return services per day with a 19 seat Beechcraft 190D aircraft between Whakatane and Wellington– a total of 95 seats per day in each direction.

Passengers from the Eastern Bay of Plenty currently travel to Wellington via Auckland or travel by road to Rotorua, Tauranga or Gisborne to catch a direct flight to Wellington.

It is believed that Air New Zealand's failure to provide a direct service between Whakatane and Wellington has been a significant impediment to the growth and development of the Eastern Bay of Plenty region.

Visitor-based demand

Tourism

The tourism industry can have a significant benefit to a regions air services in terms of destinations, frequency and aircraft size. An example of this are the daily direct services between Rotorua and Christchurch, which meet the tourist demand for group tour travel between Rotorua and Queenstown. During the main tourist season (September to March) this route is serviced by 476 seats per day in each direction, provided by both jet and turboprop aircraft.

Conferences

The demand created by larger conferences has a different pattern to normal passenger travel in that conferences frequently require a large number of seats on the day the conference commences and the day the conference ends. The typical requirement is to move delegates into and out of the venue without a further nights accommodation. Unless there are overlapping conferences on an ongoing basis, fluctuating seat requirements are therefore more suited to charter than scheduled services.

Events

Events are similar to conferences in that they create a demand for a large number of seats for persons to arrive at the location within 12 hours of the event and to depart within 12 hours of it finishing.

Consideration could be given to developing an area to the north of the airfield which has a natural contour which would appear to be suitable for the development of an outdoor events venue for hosting trade shows, sporting events, concerts etc. (such as the Mystery Creek Events Centre next to Hamilton Airport)

Regular sporting and recreational events are an effective means of increasing the demand for airline seats and increasing the frequency of services.

Corporate Meetings and Seminars

The promotion of Whakatane as a venue for corporate meetings, training camps and seminars would boost the demand for airline seats and support the case for a full schedule of services between Wellington and Whakatane.

Industry-based demand

Airfreight

Companies marketing produce or goods which rely on air freight delivery may be attracted to site their factories, warehouses or offices on or close to an airport. A business park sited on the airport could attract such industries to Whakatane, thereby creating a demand for air freight services which may in some instances be combined with new or existing airline passenger services.

While New Zealand's airports carry only a small amount of freight in terms of weight, it represents 20% of the total value of goods imported and exported. Auckland, Christchurch and to a lesser extent Wellington airports dominate the air freight market with only small amounts being handled at other airports. International freight, particularly exports are generally high-value perishable goods. The bulk of domestic freight is mail, parcels and critical spare parts.

Most of New Zealand's freight exports use belly-holds of passenger aircraft. Boeing 737s do not have containerised holds, meaning that freight must be loose-loaded, which is less efficient and more expensive, particularly for transfers. Airbus A320s are containerised, but the containers are incompatible with Boeing aircraft. While they offer greater efficiency for point-to-point freight, transfers remain expensive.[2]

Aviation Industry

An attractive option is to have an airline base its operations at your airport. Nelson, Hamilton, Christchurch and Auckland currently have resident scheduled airlines and numerous airports have resident smaller airlines offering both scheduled and charter services. The north-west site would be an ideal location if such an opportunity arises, provided that the necessary investigations and planning have been undertaken in order to take advantage of the opportunity.

Within the past 12 months news reports indicated that an airline proposing to establish a base in New Zealand was considering Hamilton and Rotorua as potential options. When Whakatane Airport has reached a 'state of readiness' to proceed with development it could well be considered for future opportunities.

Air New Zealand's subsidiary which fits-out luxury privately-owned 737 800 jet aircraft at Blenheim Airport is a recent example of the type of industrial activity which can be undertaken at smaller airports. Having sufficient land available for large hangars with runway access creates opportunities to attract aircraft maintenance, construction, rebuilding, fit-outs, painting, signage and refurbishment for both the domestic and international markets.

[2] Extract from Ministry of Economic Development : Airport Infrastructure Stocktake/Audit : 2004

1.3 AIRCRAFT REQUIREMENTS

The following table shows the takeoff and landing requirements for a range of aircraft which may in the future provide services to and from Whakatane. These are tabulated for aircraft carrying a maximum payload under typical ambient conditions.

Aircraft takeoff and landing distance requirements

Aircraft	Destination	Takeoff weight required for full payload kg	Takeoff field length required m	Landing weight required for full payload kg	Landing distance required on wet runway m
B1900D	All New Zealand	7767	1162	7605	978
Q300	All New Zealand	19505	1010	19051	1162
Q400	All New Zealand	29257	1404	28009	1481
ATR72	All New Zealand	22500	1280	22350	1254
B737-300	Wellington	54900	1543		
	Christchurch	55900	1609		
	Queenstown	57100	1686		
	Whakatane			52900	1647
A320	Wellington	66100	1490*		
	Christchurch	66900	1500*		
	Queenstown	68000	1560*		
	Sydney	73600	1860		
	Melbourne	75200	1980		
	Brisbane	74300	1910		
	Whakatane			64300	1682*
B737-800	Wellington	68400	1724*		
	Christchurch	69300	1766		
	Queenstown	70400	1817		
	Sydney	76200	2121		
	Melbourne	77900	2263		
	Brisbane	77000	2167		
	Whakatane			66400	1906

*Note: Minimum practical runway length based on airline experience for NZ operation of B737-300, A320 and B737-800 are 1520m, 1750m and 1750m respectively.

1.4 DESIGN AIRCRAFT

In order to determine the ultimate capacity and design of an airport it is useful to adopt a 'design aircraft' typical of those which are likely to use the airport when it reaches that capacity.

The design aircraft is used to determine issues such as runway dimensions, pavement strength, terminal size and obstacle clearances.

The Boeing 737 800 has been chosen as the 'design' aircraft for planning purposes at Whakatane Airport as it has been used for this purpose by several other regional airports throughout the country and sets a realistic maxima for 1900–2200 metre runways on domestic and short-haul international passenger services.

The following table shows the operational requirements for the 737 800.

Operational Requirements at Whakatane Airport : Boeing 737 800	
Take-off runway length to Melbourne with full payload (77,000kgs):	2263m
Braking distance required on wet runway:	1906m
Pavement strength required:	PCN 50
Minimum runway width required:	30m
Landing weight required with full payload:	66,400kgs
Tail height clearance on apron (push-out parking)	12.57m
Apron strength	80 tonnes
Rescue Fire Category required (Domestic flights):	Category 4
Rescue Fire Category required (International flights	Category 7
Passengers	
- Typical 2-class configuration	
- Typical 1-class configuration	

1.5 MITIGATION OF ADVERSE EFFECTS

Air transport is an essential component of modern lifestyle and is an important driver of economic growth and development within local communities. Airports are an essential component of the air transport system. However, aircraft cause adverse effects such as noise and emissions and these need to be addressed by the district planning process.

An important objective of this Plan has been to reduce, mitigate or where possible avoid the adverse effects associated with airport operations.

Issues such as aircraft noise, visual intrusion, level of aircraft activity, engine exhaust residues, obstacle height limits, tree topping and removal, public safety, restrictions on adjoining land utilisation, natural landform and vegetation disturbance, environmental pollution and the effects on landscape and amenity values have been taken account of in determining the final design characteristics.

Aircraft noise assessments have been undertaken by acoustic engineers Marshall Day Acoustics Ltd, a company with considerable experience in assessing the impacts of aircraft noise on and surrounding airports. The noise effects have been assessed in accordance with the principles and practices established by the New Zealand Standard NZS. 6805:1992, 'Airport Noise Management and Land Use Planning'.

The purpose of this Plan is to integrate the airport into the community to ensure that it retains its capacity to serve the community's increasing needs for air transport services into the future.

One of the objectives in designing the extended runway has been to minimise the adverse effects where possible on neighbouring properties. One of the limitations in extending the runway is the effect that any extension of the eastern threshold would have on the obstacle height limit over the Whakatane Golf course.

The trees along the extended centreline of the flight path are currently subject to height controls and any extension of the existing runway to the east will reduce the height limit which the trees must not exceed. For each additional 62.5 metres of runway length to the east the obstacle limitation surface over the golf course is lowered by 1 metre.

A realignment of the primary runway was investigated with a view to removing or mitigating this and other adverse effects arising from any runway extension. However, an assessment of the earthworks required made this option untenable from a cost perspective.

In order to minimise the adverse effect on the golf course it is recommended that an additional eight hectares of land be acquired at the western end of the airport, which will allow the proposed eastern extension of the existing runway to be shortened by 210 metres. This will also move the air noise boundary a further 200 metres from the residential dwellings on Aerodrome Road.

2 ASSESSMENT OF AIRPORT CAPACITY

Airports are capital-intensive long-term strategic assets which require correspondingly long-term protection in order to meet the future growth in demand for air transport services. This plan is therefore based on an assessment of the airports total capacity and not the percentage of that capacity which is likely to be achieved within a given time period, such as 10, 20 or 30 years.

Given the high capital cost of building new airports and the current environmental legislation, experts believe that it is highly unlikely that a new 'green-fields' airport will be constructed in this country. This is supported by Environment Bay of Plenty's recent decision to not proceed with a proposal to establish a single regional airport for the Bay of Plenty region.

It is therefore important that the capacity of existing airports be protected in order to provide for the future air transport needs of the catchments they serve. It is not possible to forecast accurately when that demand will occur, but without such protection, the encroachment of incompatible land use activities will limit or prevent the utilisation of that capacity.

Many New Zealand airports have already been compromised by the encroachment of residential and industrial developments with consequent restrictions on their operational capacity. It is therefore vital that the remaining airports be protected to the fullest extent possible in order to retain their capacity.

From a practical perspective, airport protection should be based on capacity rather than time-limited forecasts of future demand. Airport Master Plans should be 'blueprints' for development of that capacity where each phase of development is activated by a given set of criteria.

The methodology used in preparing this plan includes an assessment of the airport's optimum capacity. That capacity is an unrealised community asset which is 'reserved' to meet the community's future requirements for air transport services, aviation-based recreational activities and other airport-related services.

What is airport capacity?

Airport capacity is ultimately the number of runways an airport can accommodated and the maximum number of aircraft which can take-off and land on those runways in any consecutive 24 hour period.

Maximum runway utilisation is affected by the skill and competence of the air traffic controller, the number of aprons available for aircraft parking and how quickly each aircraft can be unloaded, re-loaded and despatched. This in turn is influenced by the time taken to process passengers and freight and the physical capacity of the passenger terminal and freight-handling facilities.

Definition of Airport Capacity (for Whakatane Airport)

For the purposes of this plan airport capacity is defined as the "*optimum operational limit"* for the airport given its location and potential for growth and development"

The term "optimum operational limit" reflects the fact that Whakatane Airport will never achieve maximum runway utilisation". In fact, it is unlikely to ever achieve maximum runway utilisation during its busiest hour of the day. So the question is, what is a realistic optimum operational limit to be protected from the encroachment of incompatible land use activities.

What affects capacity?

Airport capacity is affected by factors such as –

- the number of take off and landing slots (this is determined by the necessary separation between aircraft and is essentially a function of the air traffic control system and the type of aircraft in use (e.g. the speed with which each aircraft clears the runway)
- weather conditions
- the configuration of the airport
- the size of aircraft the runway can accommodate (influenced by the length, surface and structure of the runway and its obstacle-free approach and take-off paths)
- the rate of passenger throughput at terminal facilities (which is a function of the number of aircraft stands at terminals as well as the terminal building capacity)
- the organisation and procedures for airspace use (i.e. air traffic management)
- airport operating procedures
- airmanship
- technology

Although the number of aeroplanes using an airport is subject to absolute limits, there is considerable flexibility to increase or decrease actual seat capacity through the size of the aircraft in use.

Capacity Assessment

The capacity assessment is based on the following criteria -

- the maximum runway length
- the operating range of the design aircraft
- the number of destinations likely to be serviced
- the maximum number of services per day to each of those destinations
- the size and capacity of aircraft servicing those destinations
- the maximum number of aircraft likely to utilise the runway during the busiest hour
- the runways capacity to handle that number of busy hour movements
- the number of aprons required to accommodate the busy hour traffic
- the size of terminal required to service the busiest hour

The maximum runway take-off distance has been set at 2250 metres and the landing distance at 1950 metres. The maximum range for the 737 800 design aircraft is 2800 kilometres. The following table summarises the remainder of the criteria used in the capacity assessment.

Possible Destinations	Distance (kms)	Arrivals [3]per day	Aircraft type or equivalent	Seating Capacity	Ave Load %	Busy hour arrival / departure	Aprons Required	Runway rime (seconds)	Domestic passengers		International passengers	
									Arr	Dep	Arr	Dep
Auckland		3	ATR72 500	68	75	1	1	40	51	51		
		2	Dash 300Q	50	75							
Wellington		2	737 300	136	75	1	1	50	102	102		
		3	ATR72 500	68	75							
Christchurch		1	ATR72 500	68	75	1	1	40	51	51		
Hamilton		-										
Palmerston North		-										
New Plymouth		-										
Melbourne	2,800	3	737 800	187	85	1	1	50			159	159
Sydney		4	737 800	187	85	1	1	50			159	159
Brisbane		3	737 800	187	85	1	1	50			159	159
Noumea		-										
Suva		-										
Apia		-										
TOTALS		21				6	6	4.7	204	204	477	477

Aircraft Movements

The following table shows the capacity assessment for aircraft movements. It is not the maximum operational capacity as that would never be achieved.

Capacity-based forecast of aircraft movements

Aircraft Type	Average Arrivals Per Day	Average Movements Per Day	Capacity-based forecast 1890m runway	
			Total Movements Per Year	% Night Movements
Boeing 737 800	10	20	7,300	33%
Boeing 737 300	2	4	1,460	10%
Aerospatiale ATR72	7	14	5,110	10%
Bombardier Dash 8 Q300	2	4	1,460	10%
Fokker Friendship F27	1	2	730	100%
GA Twin-engine fixed-wing	8	16	6,000	15%
GA Single-engine fixed-wing	27	55	20,000	15%
Helicopter	11	22	8,000	15%
Totals	69	137	50,060	

[3] These movements are consistent with the schedule of total movements per day

The number of movements is only relevant in that it has been used to calculate the air noise boundaries, which limits the total amount of noise which aircraft are permitted to cause within a given period of time. There is no limit on the number of movements provided that the airport remains within its noise 'cap'.

P*assenger Terminal*

Provision has been made for a two-level terminal building with a total floor space of 12,000m^2.

The optimum capacity is based on a regional facility catering for 10 trans-Tasman services, 2 scheduled domestic jet services and 9 scheduled domestic turboprop services per day – plus 1 domestic turboprop freight service per night, 36 fixed-wing general aviation arrivals and 11 helicopter arrivals per day.

The table on the previous page shows the following one-way busy hour (OWBH) arrivals.

- domestic passenger 204
- international arrivals 477
- total 681

Based on a terminal size of 12,000m^2, the floor space per arriving passenger would be 17.6m^2 . This compares with the International Civil Aviation guideline of 24.0m^2. Given that Whakatane is a regional airport only and not a major international airport, the provision of 17.6m^2 per person is believed to be realistic.

Runway Capacity

There are numerous methods of measuring airport capacity, but the most commonly used method in New Zealand is *"peak hour capacity".*

Runway capacity is significantly influenced by *runway occupancy time* (ROT), that is the time the runway is occupied by an aircraft during landing or taking off.

The runway occupancy time for a B737 or A320 is 45-50 seconds and 35-40 seconds for a turboprop aircraft. Therefore the separation achieved between aircraft using the runway largely determines the runway service rate or runway capacity. Minimising the separation time between aircraft movements increases runway capacity.

However, maximum runway capacity depends on a blend of operational, physical, procedural and human factors, such as runway physical configuration, runway occupancy time, aircraft mix, ratio of arrivals to departures; air traffic control procedures, minimum separation standards, the skill of the pilot and air traffic controller and environmental factors such as daylight and weather conditions. Aircraft mix is the key determinant of capacity as it largely determines runway occupancy time. Delays increase as demand approaches capacity. The level of *unacceptable delay* determines the capacity limit for any airport or runway. The question arises as to what are unacceptable delays.

Runway occupancy time at Whakatane Airport is increased by not having a parallel taxiway for aircraft entering or exiting the runway – nor is one justified at such a low level of activity. The runway is also used as the taxiway. The following table shows the calculation of maximum movements per hour.

Estimated runway capacity : Whakatane Airport 1280m runway length				
	Approach		Takeoff	
	from west (seconds)	from east (seconds)	from west (seconds)	from east (seconds)
Landing	50	50		
Takeoff			40	40
Taxiing	30	50	50	30
Total ROT[4]	80	100	90	70
Frequency from direction	25%	75%	25%	75%
	20	75	23	53
Average ROT landing / takeoff	95		75	
Movements per hour	21			

Apron Capacity

Six aprons are required to meet the one-way-busy-hour traffic.

Limitation on Aircraft Noise

The noise boundaries are based on 50,000 movements per annum including 16,000 scheduled airline services and 34,000 general aviation movements. This compares with Palmerston North Airport which currently has 22,000 scheduled and 30,000 general aviation movements per annum.

Car Parking Capacity

The assessment of car parking requirements is 700 parks. This is based on a survey of existing car parking capacity at Tauranga, Rotorua, Napier, Palmerston North, Dunedin and Invercargill airports.

[4] *ROT Runway occupancy time*

3 OPTIONS INVESTIGATION

The planning process included an assessment of the options aimed at optimising airport capacity and locating appropriate sites for –

Operational Areas
- the primary sealed runway, airfield strip and 300 metre runway end safety areas
- paved taxiways and aprons
- a grass runway for light aircraft, microlights and gliders
- fuel storage tanks (above or below ground) and dispensing equipment
- navigation equipment (e.g. VOR, aerodrome beacon, PAPIS/VASIS, approach lights)
- airside equipment storage (baggage trailers, toilet carts, tractor units, aircraft steps, aircraft starter transformers, de-icing equipment, chemicals etc)
- jet-blast deflector shields
- engine testing bays

Buildings
- passenger terminal building
- air traffic control tower
- rescue fire station and emergency control centre
- air freight warehouses
- fuel tanker garage
- dangerous goods storage
- light fixed-wing aircraft hangars
- helicopter hangars
- aircraft maintenance hangars
- garaging for grounds maintenance vehicles, plant and equipment
- accommodation (for resident site manager and security officer)
- pilot information centre
- pilot education and training facilities
- airport accommodation, meeting and conference facilities (i.e. hotels, motels)

Internal Roads & Parking Areas
- internal roading network
- public car parking
- rental car parking
- coach parks

Designated Areas and Compounds
- aircraft isolation area
- emergency muster stations
- parachute drop zone
- telecommunications equipment
- helicopter training area for low flying and circuit training
- aviation industrial park (e.g. aircraft construction and re-construction)
- aviation fuel storage compound
- meteorological weather station/s
- car washing and grooming booth
- emergency fire training area

Utilities and Services

- aircraft starter power supply outlets on aprons
- back-up power generation
- back-up water supply tanks
- sewage pumping station
- water sumps and scrubbers for polluted run-off collection and treatment
- rubbish disposal (including items confiscated by international border control services)

3.1 RUNWAY STRIP

The runway strip is the prepared area within which the sealed runway is symmetrically located. The design of airspace protection around an airport is very dependent on the selection of the runway strip width.

The normal strip width for runways with non-precision approaches is 150m and this is almost universal at jet-capable airports in New Zealand. Exceptions include Auckland and Christchurch which have a strip width of 300m and Dunedin which has a strip width of 220m.

Constraints at Whakatane airport include Aerodrome Road which is too close to the runway to accommodate a 300m or even a 220m wide strip. For this reason a 150m strip, as exists currently, is proposed for the extended runway.

It is important to note that a "transitional side surface" of 1V:7H slope should be provided without any penetrations (including aircraft parked at hard stands) if at all possible. If 1:7 is not provided then airport operating minima may be adversely affected.

The ends of the extended strip are co-incident with the obstacle limitation surface (OLS) origin points described in the section on Flight Path Design.[5]

The width of the runway strip has an important bearing on the type of navigation systems which may be used by aircraft on approach to the airport. Navigation systems range from visual only to full precision instrument approaches. The latter allow aircraft to land and take-off in virtually any visibility conditions.

For example, for any reference code 3 or 4 airports (which includes Whakatane) the following runway airstrip widths are required for the specified levels of navigation performance –

Service Type	Approach System	Runway strip width (metres)
International	Precision	300
	Non-precision	150
Domestic	Precision	220
	Non-precision	150
	Non-instrument (aircraft less than 22700kg MCTOW)	90

[5] Astral Consultants Ltd

The assessment of an alternate runway orientation also considered the possibility of increasing the strip width to 220 or 300 metres to permit instrument precision approaches.

3.2 PRIMARY RUNWAY

In order to realise the airports optimum capacity, provision must be made for the extension, strengthening and possible widening of the primary runway when the demand eventuates. This raises the issue as to whether the existing runway and other airport infrastructure is in the best possible location from an operational perspective. This section of the plan investigates and addresses these issues.

Option 1: Alternate alignment

The 'key' issues with the current runway alignment are –

- the highest terrain on Kohi Point ridge, which is situated within the Whakatane urban area approximately 8 kilometres in a direct line from the airport, intrudes the ICAO[6] maximum 2% obstacle limitation surface for take-offs on runway 09 and approaches on runway 27. The alternate circling approach path increases the operating minima for aircraft, placing greater restrictions on the use of the airport in adverse weather conditions. Fortunately, the weather conditions at Whakatane are generally favourable and informed sources report that there are very few occasions where commercial aircraft are diverted to another airport as a result of adverse weather conditions.

- any extension of the runway to the east will reduce the obstacle height limits over the Whakatane golf course, requiring that trees which intrude the obstacle limitation surfaces to be topped or removed. As it is likely to be many years before the recommended runway extensions are constructed, the Club should have more than adequate time to establish lower-growing species as replacements for trees which will need to be removed in the future.

- the air noise boundary within which it is recommended that residential dwellings be excluded will possibly affect up to three existing houses at some time in the future when the airport gets close to its optimum capacity for aircraft operations. There is no reliable way of knowing when that level will be reached and it is possible that it may not occur within the economic life of the dwellings concerned.

  The purpose of the air noise boundary is to protect the airports right to generate a specified level of aircraft noise and to provide certainty to property owners wishing to develop noise sensitive activities close to the airport or beneath airport flight paths by specifying a 'maximum' limit on aircraft noise.

  Calculation of the 'maximum' noise level represented by the air noise boundary takes account of the trend towards quieter aircraft, a trend which is expected to continue. Over time, this trend will allow an increase in the number of aircraft movements without exceeding the 'maximum' noise level permitted within the boundary.

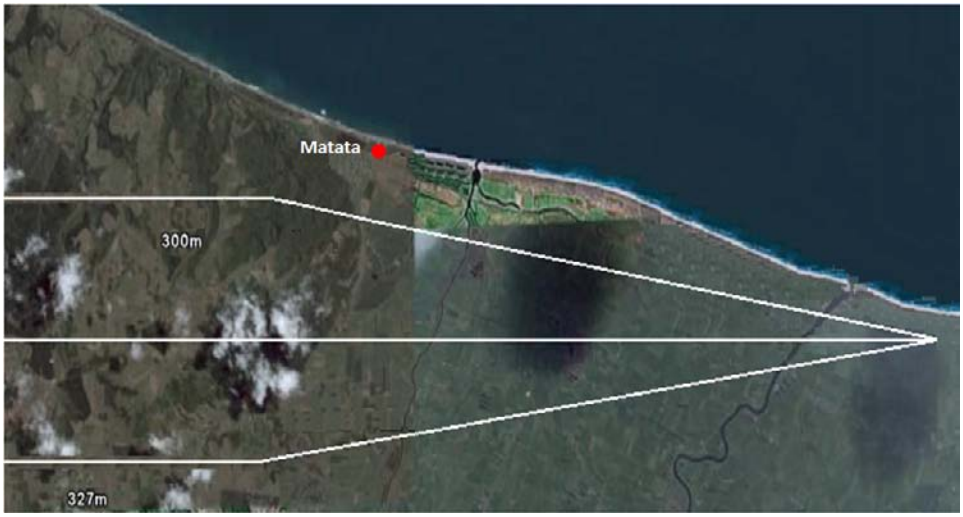
[6] International Civil Aviation Organisation

The purpose of assessing an alternative alignment was to ascertain whether it is possible to mitigate or avoid the above-mentioned adverse effects. The 07/25 alignment was chosen to provide a straight-in approach over the sea from the east, crossing the coast within 200 metres of the runway threshold, thereby avoiding the Kohi Point ridge, golf course and all residential and other properties.

A CAD Civil assessment of the cut and fill required to develop the airfield established a 'cut' requirement of 109,000m^3 and a 'fill' requirement of 854,000m^3, leaving a net fill requirement of 745,000m^3. Subject to the necessary resource consents, the net fill requirement could be sourced from the sand-dunes adjoining the site. However, this volume of earthworks is likely to be considered excessive in terms of development cost and environmental effects.

The environmental issues associated with moving such a large quantity of fill at some future time are a significant risk in that they have the potential to divert attention away from the primary objective of protecting the operational capacity of the airport from the encroachment of incompatible land uses. While immediate construction of the new airfield embankment would minimise that risk, the expense of undertaking such major earthworks so far in advance of any known or likely demand would be unrealistic.

Another potential issue is the height of the ridge extending southwards from Matata which in places may intrude the airports 2% take-off and approach surfaces, as indicated in the diagram below. In the event of a decision being made to further investigate this option, it would be necessary to undertake a more detailed assessment of the potential flight path obstacles.



Option 2 : Extension of Existing Runway

The existing sealed runway measures 1280m in length by 30.5 metres in width. The objective is to extend the runway to achieve a minimum takeoff run (TORA) of 2200m and a landing distance (LDA) of 1910m when the demand eventuates.

These distances are based on the requirements of the Boeing 737-800 design aircraft for unrestricted operations to and from the eastern seaboard cities of Australia.[7] The B737-800 is a code 4C aircraft in terms of the aerodrome design standards contained in New Zealand Civil Aviation Advisory Circular (AC) 139-6.

The existing runway has an east-west alignment. The distance from the eastern end of the runway to the boundary with the Whakatane golf course is 720m.[8] A 20 metre-wide road is required immediately inside the boundary to access grazing leases and potential sites for a new terminal and business park complex to the north of the runway strip.

The following diagram shows the existing runway and the distances available for extensions in both directions within the airport boundaries, including the requirement for a 300 x 150 metre runway end safety area (RESA) at each end of the extended runway.

The following options have been considered for extending the runway.

[7] Refer to section [x] for the basis of these distances.

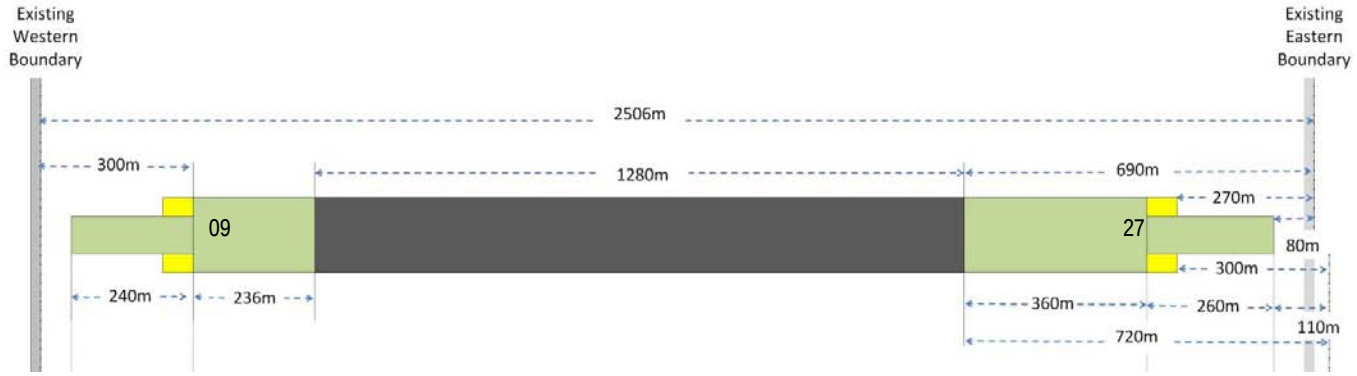
[8] Distances to the boundaries were provided by Osyris Group and take account of the oblique angle of the eastern boundary with the runway centreline.

Option 2.1

Option 2.1 utilises the available distance within the airport's existing boundaries. The approach slope on Runway 27 (from the east) is the limiting factor in that the design aircraft requires a braking distance of 1906 metres on a wet runway. The maximum 2% international approach slope means that in order to meet this requirement the obstacle height at the airport/golf course boundary would be reduced by 45% from 10.6 to 5.8 metres.

This option would provide a runway length of 1876 metres supplemented by a starter extension of 240 metres on runway 09 - providing a total take-off run of 2116 metres - and a starter extension of 250 metres on runway 27 - providing a take-off run of 2126 metres. The braking distance in both directions would be 1876 metres.

The following diagram shows the extended runway and starter extensions.



Option 2.1 : Extended runway located within existing airport boundaries with starter extensions

Option 2.2

Option 2.2 increases the runway length beyond the airport western boundary in order to achieve the unrestricted operational requirements of the 737 800 design aircraft for non-stop route distances of up to 2,800 kilometres.

This option requires the designation and eventual acquisition of the following land –

1) a section of unformed legal road adjoining the western boundary of the airport measuring 250 metres in length by approximately 20 metres in width (i.e. an area of 0.5 hectares). The road reserve would need to be 'stopped' and the land vested in the Airport Authority for airport purposes. The unformed road provides legal access to four separate allotments of land. It does not currently provide physical access. It is proposed that legal access be restored by an alternative route running parallel with the northern perimeter of the runway strip (broadly following the existing formed track which provides vehicle access to the northern side of the airport)

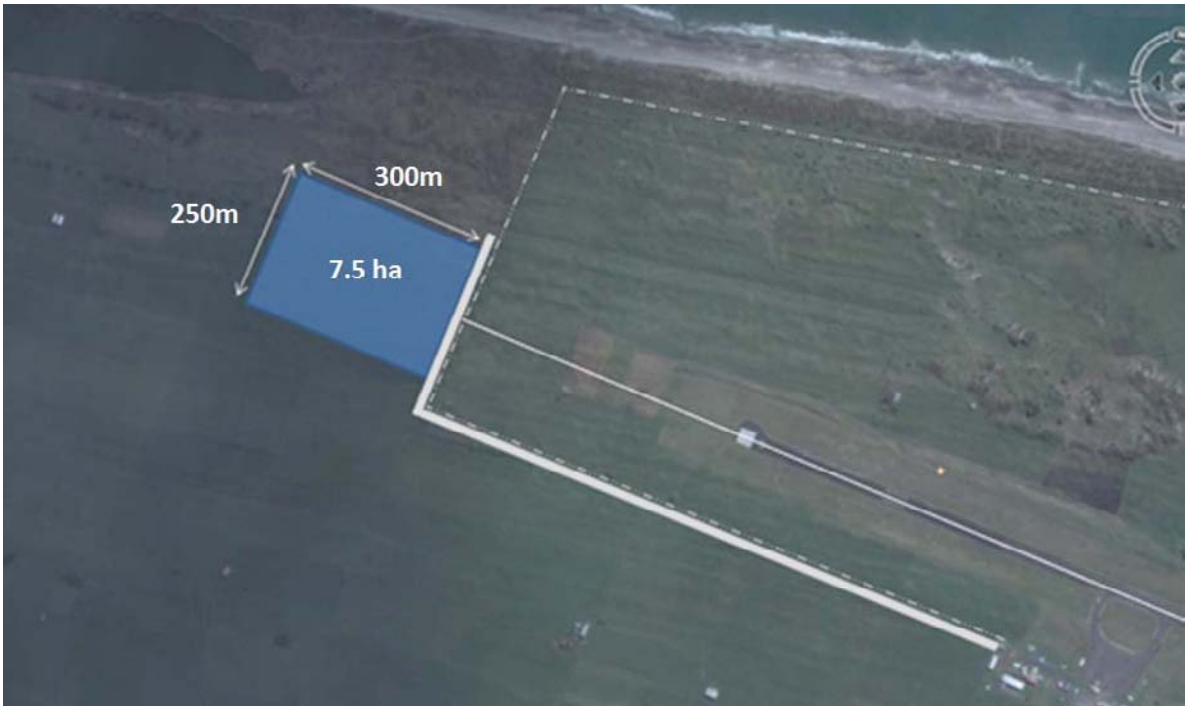
2) 7.5 hectares of neighbouring farmland measuring 300 metres in length by 250 metres in width, creating an extension of the 150 metre-wide runway strip. The extra 50 metres in width on either side of the strip is for protection of the 1:7 transitional side slope to a height of 7 metres above runway height.

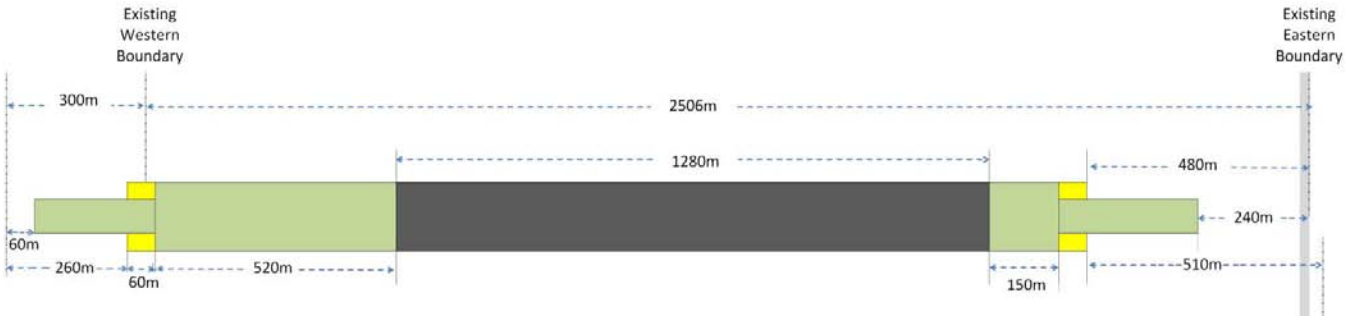
The extended runway would be 1950 metres in length supplemented by a western starter extension of 256 metres on runway 09 - providing a take-off run of 2206 metres - and an eastern starter extension of 300 metres on runway 27 - providing a take-off run of 2250 metres.

Advantages of this option are –

- It meets the performance requirements of the Boeing 737 800 design aircraft for domestic and short-haul international services
- the air noise boundary would move 200 metres to the west away from the residential dwellings on Aerodrome Road
- the existing obstacle height limits over Whakatane golf course would be close to the existing levels
- the distance between the fan origin and flight-path tangent-point would increase by 3.5 kilometres for take-offs to and approaches from the east

The following diagrams show the location of the additional land required to achieve this proposal and the configuration of the proposed extended runway and starter extensions.





The following tables compare the performance of the 737 800 design aircraft for the two runway extension options 2.1 and 2.2

Runway Performance

Available	Existing Runway	Option 2.1 Extend runway within airport boundary	Option 2.2 Extend runway beyond airport boundary
Take-off run available	1280	2116 / 2126	2210 / 2250
Take-off distance available	1340	2176 / 2186	2270 / 2310
Braking distance available	1280	1876	1950

Design Aircraft Requirements

Take-Off Distance	Queenstown	Melbourne	Sydney	Brisbane
Take-off distance required	1560	2263	2121	2167
Existing runway (does not meet required strength)	-220	-923	-781	-827
Option 2.1 Extend runway within airport boundary	540	-163	-21	-67
Option 2.2 Extend runway beyond airport boundary	700	-3	39	93

Figures in red show the distance by which the runway is short of the design aircraft requirement
Figures in black show the distance by which the runway exceeds the design aircraft requirement

Braking Distance

Braking distance required (wet runway)	1906
Existing runway (runway not up to required strength)	-626
Extend runway with airport boundary	-30
Extend runway beyond airport boundary	44

Option 1 : Alternate alignment

This option is not recommended due to the environmental, financial and planning risks associated with such a project and the need to commit to the proposal well in advance of any known demand.

Option 2 : Extend existing runway

Two options have been considered for extending the runway. The first is the maximum length achievable within the airport boundaries and the second is the optimum length required to meet the unrestricted take-off and landing requirements of the 737 800 design aircraft for non-stop routes of up to 2800 kilometres.

2.1 : Within airport boundary

The 1876 metre full-width runway plus a 240 metre starter extension on runway 09 and a 250 metre starter extension on runway 27 provides 92% of the design aircrafts take-off distance requirement for unrestricted departures to Melbourne, which is the maximum route distance used for planning purposes. The runway configuration also provides 98% of the required braking length. The 2% shortfall will have only a small effect on the design aircrafts maximum landing weight at Whakatane Airport.

The road alignment for vehicle access to the northern side of the airport will need to be situated alongside the golf club boundary as there is barely sufficient area available for a 20 metre road reserve without cutting into one corner of the runway end safety area.

The major disadvantage of this option is a 4.8 metre reduction in the obstacle height permitted at the golf club boundary and that part of the course where the upslope is below tree height. The mitigating factor is that the runway extension is likely to be many years away, which allows adequate time for the Club to establish lower growing species in advance of the requirement to top or remove existing trees.

2.2 : Extend beyond airport boundary

This option is designed to meet the performance requirements of the 737 800 design aircraft. The additional advantages of this option are that it maintains the existing height limits above the Whakatane golf course and moves the air noise boundary 200 metres to the west of Option 2.1. The disadvantages are that it requires the designation and eventual purchase of 7.5 hectares of privately-owned farmland and requires the stopping and replacement of a section of unformed legal road which provides legal (not formed) access to four blocks of land.

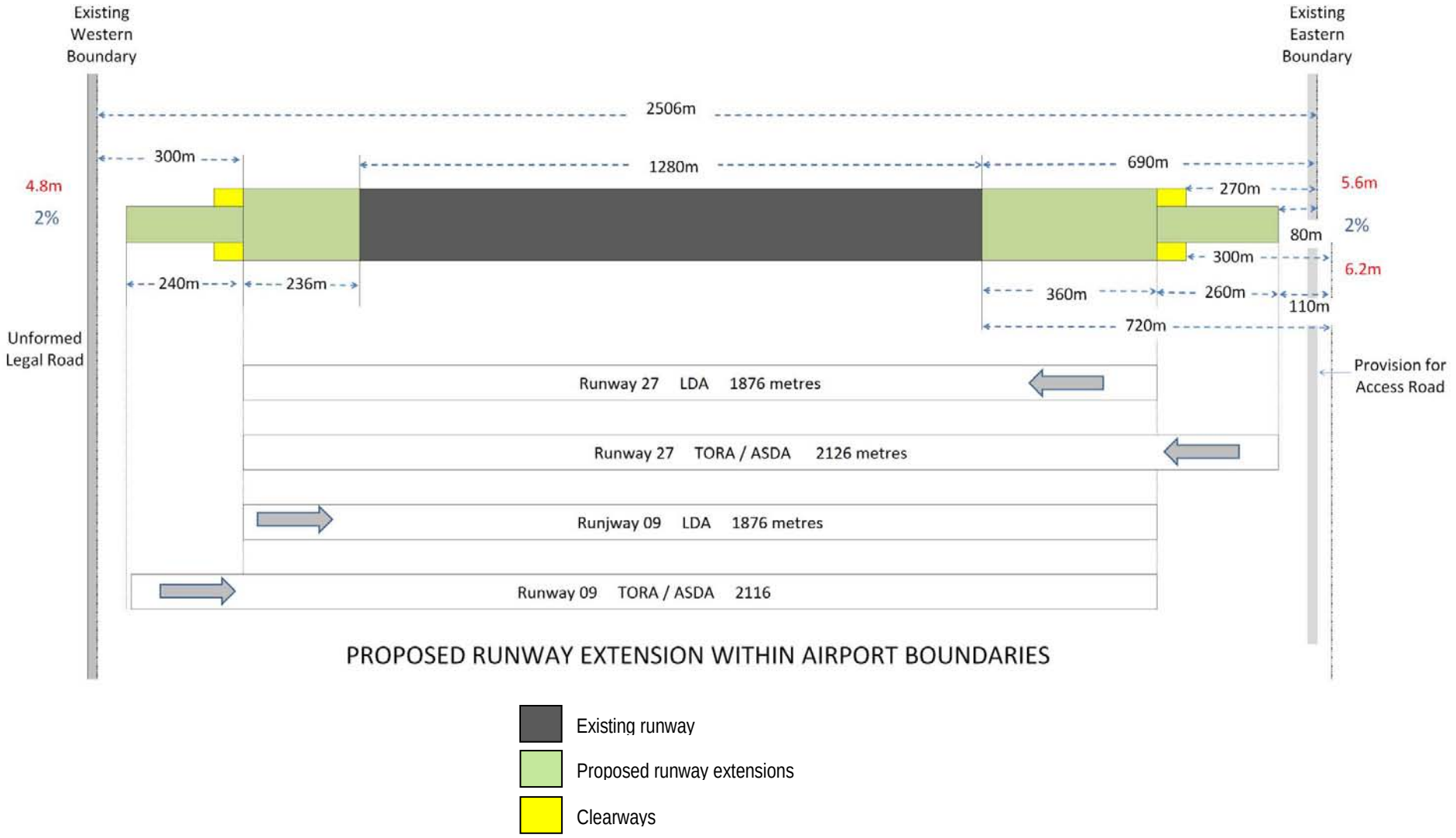
When purchasing or leasing new aircraft, airlines are more likely to consider existing runway ‘groups’ than the length of individual runways. Therefore, from a risk management perspective it is prudent to remain within a particular group than to be the ‘odd one out’ when it comes to runway dimensions. The following table indicates where Whakatane Airport currently ranks alongside other New Zealand airports relative to runway length? It also shows where options 2.1 and 2.2 rank.

Comparison of Runway Lengths at New Zealand Airports							
International		Trans Tasman		Trans Tasman Capable		Regional	
>3,000m		>1,800m		>1,800m		>1,000m	
Auckland	3,635	Hamilton	1,960	Ohakea	2,447	Rotorua	1,622
Christchurch	3,287	Wellington	1,936	Invercargill	2,210	Blenheim	1,425
		Palmerston Nth	1,902	Tauranga	1,825	Kaitaia	1,402
		Dunedin	1,900	**Option 2.1**	**2,134**	Taupo	1,386
		Queenstown	1,892	**Option 2.2**	**2,250**	Wanganui	1,378
						Nelson	1,347
						Hokitika	1,314
						Gisborne	1,310
						Napier	1,310
						New Plymouth	1,310
						Oamaru	1,283
						Whakatane	**1,280**
						Timaru	1,280
						Wanaka	1,200
						Whangarei	1,097

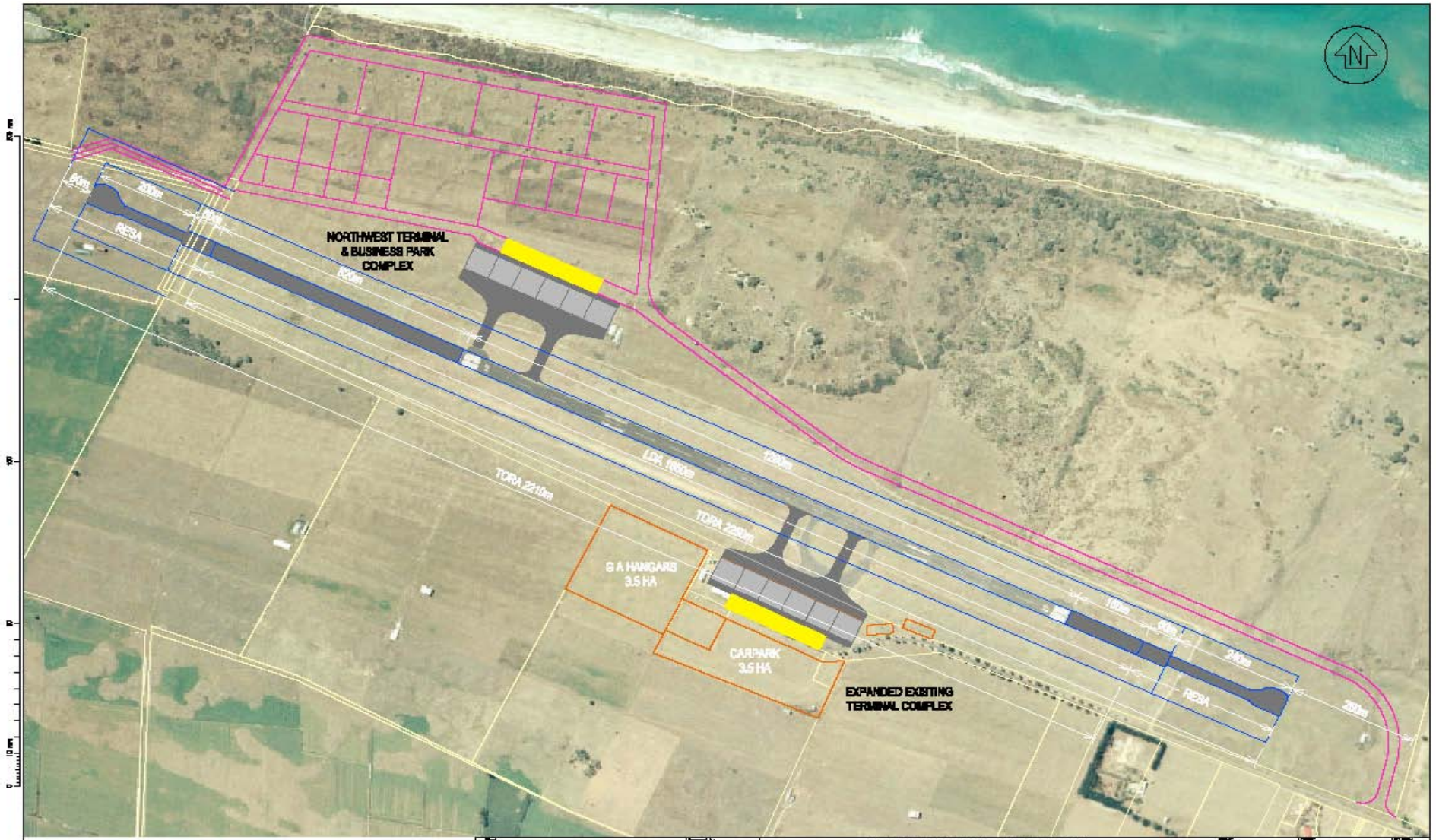
Recommendation

It is recommended that Option 2.2 be the preferred option with Option 2.1 being the backup option. The diagrams on the following pages show the relative positions and dimensions of the existing runway compared to options 2.1 and 2.2 It will be noted that the eastern boundary is not perpendicular to Aerodrome Road – hence two boundary lines are shown which reflect the relative boundary positions 75 metres either side of extended centre-line of the runway.

Option 2.1 Runway Extension



Option 2.2 Runway Extension


NORTHWEST TERMINAL
& BUSINESS PARK
COMPLEX
RESA
TORA 2218m
LDA 1693m
TORA 2282m
G A HANGARS
3.5 HA
CARPARK
3.5 HA
EXPANDED EXISTING
TERMINAL COMPLEX
RESA
LEGEND:
TORA = TAKE OFF RUN AVAILABLE
LDA = LANDING DISTANCE AVAILABLE
RESA = RUNWAY SAFETY AREA
OPUS
WHAKATANE DISTRICT COUNCIL
WHAKATANE AIRPORT
AIRPORT MASTER PLAN
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3.3 FLIGHT PATHS

With an east/west runway alignment and ranges of hills situated 8 kilometres to the east and 15 kilometres to the west of the airport, the location of the approach and take-off paths are an important aspect of operational planning.

Astral Aviation Consultants, which works extensively with airports and airlines throughout New Zealand and overseas, has assisted with the design and operational requirements for the runway, airstrip, navigation aids, flight paths and obstacle limitation surfaces. Astrals advice is contained in a separate report which has also been integrated into this plan.

Eastern approach and take-off paths

Divergence

A straight-in approach over Kohi Point ridge encounters terrain of up to 183 metres in altitude which intrudes the 2% maximum obstacle limitation surface. A divergence of up to 15^{o} from the straight line approach is permitted without affecting the more favourable minima which apply to a straight-in approach.

Initially it appeared that a 15^{o} divergence would not be sufficient to clear the terrain obstacles, therefore other options were considered. At the same time more detailed contour information was requested but not received in sufficient detail until recently. That information has now confirmed that a divergence of 14.9^{o} will clear the terrain obstacles from a tangent point 5000 metres from the inner edge of the approach fan. This is a very significant improvement compared to the existing circling approach and improves the operating minima for the approach to runway 27 and for take-offs on runway 09.

The following diagram shows a 15^{o} divergence with a tangent at 1500 metres from the fan origin. This was evaluated at an earlier stage of the investigation in an endeavour to avoid the higher terrain on Kohi Point ridge, but the tangent point was considered to be too close to the fan origin.

Circling Approach

A circling approach with a tangent point 1850 metres from the fan origin was also considered in an to endeavour to reduce the impact of aircraft noise over the Coastlands residential area.

Western approach and take-off paths

Existing flight path

The existing straight-in approach path for runway 09 and the take-off path on runway 27 cross the coastline at Thornton and are sufficiently offshore to avoid the rising terrain to the south of Matata. This heading achieves the most favourable operating minima for aircraft using the airport.

Alternate runway alignment

The approach path shown in the following diagram originates from the western end of the alternate runway alignment and shows the higher terrain encountered at approximately 15 kilometres from the fan origin.

3.4 MAIN TERMINAL COMPLEX

The main terminal complex is defined as the aprons, passenger terminal, control tower, fire station, car park, fuel storage compound and related ancillary infrastructure. It *does not* include the area required for light aircraft hangars.

The existing terminal complex is situated on 2.5 hectares of land, which is less than half that required for a new terminal complex capable of realising the airports operational potential. The following table shows the areas required to accommodate the essential infrastructural components of a new terminal complex.

Area required for terminal complex

		Width (m)	Length (m)	Total (m^2)	Area owned by Airport Authority (m^2)	To be acquired (m^2)
Aprons		300	60	18,000	18,000	0
Terminal		200	30	6,000	6,000	0
Car park		200	90	18,000	0	18,000
Fuel compound		50	50	2,500	0	2,500
Rescue fire station		25	20	500	500	0
Control tower		15	15	225	225	0
Roads		6	800	4800	0	4,800
Emergency power		10	10	100	100	0
Buffer areas, landscaping	15%			7,519		7,519
Total (m^2)				57,644	24,825	32,819
Hectares				5.8	2.5	3.3

The following table indicates the areas required for each component of the terminal complex. Three potential sites were evaluated for the development of a new complex, which were –

1. Extending and upgrading the existing site (referred to as the South-central site)
2. North-central site
3. North-west site

Existing Terminal Site (South-Central)

The minimum area required for the development of a new terminal complex[9] to service the airports potential capacity is estimated to be 5.8 hectares.

The current site available is 2.5 hectares which would need to be supplemented by the acquisition of at least 3.5 hectares of additional land situated immediately to the south of the existing terminal complex (as shown in the diagram below).

This option would require the eventual termination of all existing leases situated within the operational area as the land will be required for apron and terminal development.

[9] i.e. terminal building, aprons, control tower, rescue fire station, car parking aprons and internal roading

It is not envisaged that the existing site would be expanded to include aircraft engineering and other business and light industrial activities associated with the business park complex proposed for the north-western site.

Part of the subject area is owned by the NZ Airways Corporation and is used as a communications site shown in the photograph (right). It is recommended that discussions be held with Airways Corporation to explore the possibility of relocating the communications aerials and equipment to a site elsewhere on the airport.

The larger part of the subject area is privately owned and is part of a livestock farming operation. The owner also owns the land to the west of the complex which is recommended for the development of a light aircraft hangar park.

Development of the complex would also require the relocation of the weather station owned and operated by the NZ Meteorological Service.

The NZ Met Service has indicated that it is prepared to relocate the station subject to a reasonable cost sharing agreement.

This option requires the building line to be moved 20 metres further from the runway to accommodate the design aircrafts 12.6 metre tail height without intruding the transitional side slope obstacle limitation surface.

The building line would not be moved until the new aprons are constructed to accommodate heavier jet aircraft. At that time the existing terminal building would need to be removed and replaced by the first stage of a new terminal building.

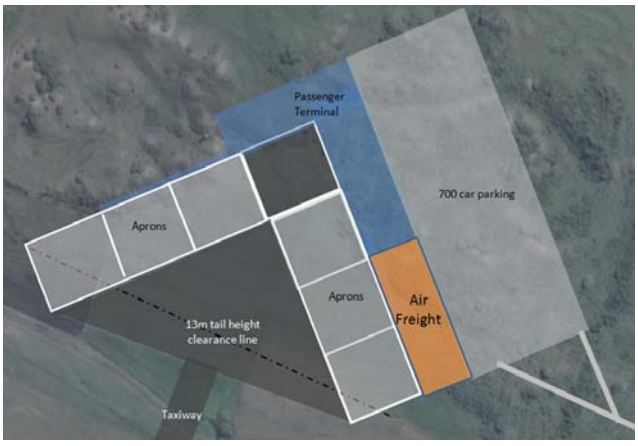
It is therefore proposed that any extensions to the existing terminal building be in the form of temporary relocatable modules which can later be moved and utilised for another purpose when it is time for the existing terminal to be moved or demolished. Further modules can be added in response to demand for increased terminal space.

North-Central Site

The north-central site is directly opposite the existing terminal complex and could provide an attractive alternative to the current site.

It comprises a triangular area of easy undulating contour of sufficient size to accommodate six 50 x 50 metre aprons in an inverted v-shaped configuration. A 'cut and fill' assessment established that the operational area would require 15,700^3 cut and 46,300 m^3 fill to level the area at a mean height 6 metres above sea level, which is the height of the airfield.

The operational area is bordered by a sand dune escarpment which would be graded to a height of approximately four metres above the operational area to provide a level platform for the passenger terminal and car parking area. An assessment of the cut and fill required for the upper level has not been undertaken at this stage.



It is envisaged that the passenger terminal would be constructed on two levels with the departure gates and baggage handling at apron level with all other facilities at first-floor level. Access to and from the aprons would be via stairs, lifts and/or escalators. Air-bridges (if required) would operate directly from the first floor departure lounges.

A sealed access road of approximately 1200 metres would follow the ridge overlooking the airfield then along the eastern boundary between the airport and golf course to an intersection with Aerodrome Road.

The existing gravel road used by lessees to access grazing blocks on the northern side of the airport would need to be diverted to the north of the new terminal complex with the addition of an 850 metre section of unsealed road connecting with the existing track to the west of the terminal.

The site would require the installation of water supply, sewage treatment, 3 phase electricity supply, street lighting and storm-water disposal systems.

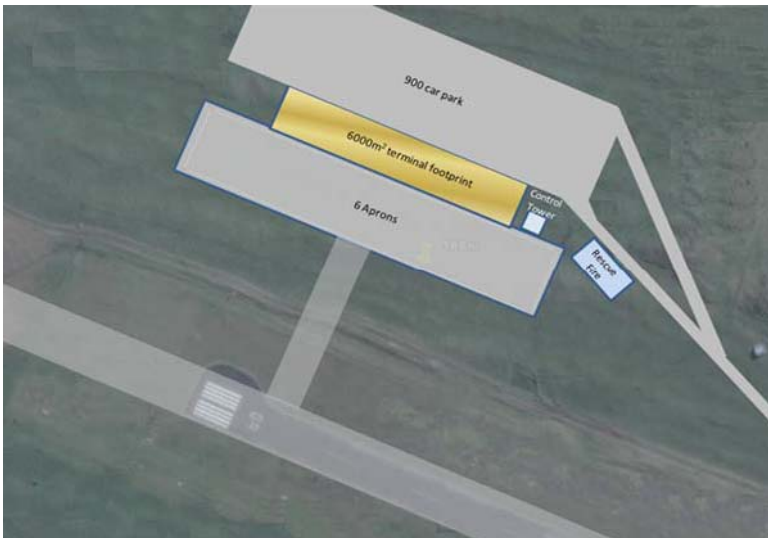
North-West Site

The north-western site extends approximately 400 metres from the airfield boundary to the coastline and 700 metres eastwards from the western boundary to a sand dune escarpment where the contour rises abruptly. The site encompasses an estimated maximum area of 28 hectares which should be available for future airside expansion and airport-related commercial and light industrial development.

Access to the site requires approximately two kilometres of sealed road commencing at the intersection with Aerodrome Road and following the golf club boundary and the existing gravel track running parallel to the northern airfield perimeter.

Utilities such as water supply, sewage treatment, three phase electricity supply, street lighting and storm-water disposal would be required to service the complex.

Leveling the initial six hectare area required for aprons, taxiways, passenger terminal, control tower, rescue fire station, car parking and internal roading has been calculated by Opus International Consultants to require 49,000m^3 cut and 57,000m^3 fill, leaving a net fill requirement of 8,000m^3. Subject to obtaining the necessary resource consents, the net fill requirement can be obtained from sand dunes bordering the site.



The following plan shows the cut and fill requirements for this site.

The volume of earthworks required to establish a six hectare platform at a relative level of 5.8 metres above sea level is not excessive and is unlikely to give rise to the environmental concerns referred to in the alternate runway proposal.

The north-west site combined with the 1950 metre runway has the most potential for growth and development. It would work best with the 1950 metre runway (Option 2.2) as the position of the terminal complex would be in the same relative position as the existing terminal complex proportional to the centre-point of the runway.

The airport business park could provide the catalyst and financial backing required to achieve the airports potential. It is the least constrained of the options presented in this report in terms of its capacity to meet any future demand for airport and airport-related development, such as freight warehousing, storage, aircraft engineering, aviation related commercial and light industrial activities, visitor accommodation, conference facilities and tourism activities. The diagram overleaf is indicative of the potential the site could have for such development.

It is believed that this site would also create significant opportunities for the development of recreational, sporting and cultural events utilising the airport infrastructure and services.

A decision to move to the North-West complex when the 'trigger' point is reached would allow the phased implementation of a plan to develop the existing terminal site as a commercial light-aircraft facility catering for commercial tourism, charter, pilot training and recreational flying activities.

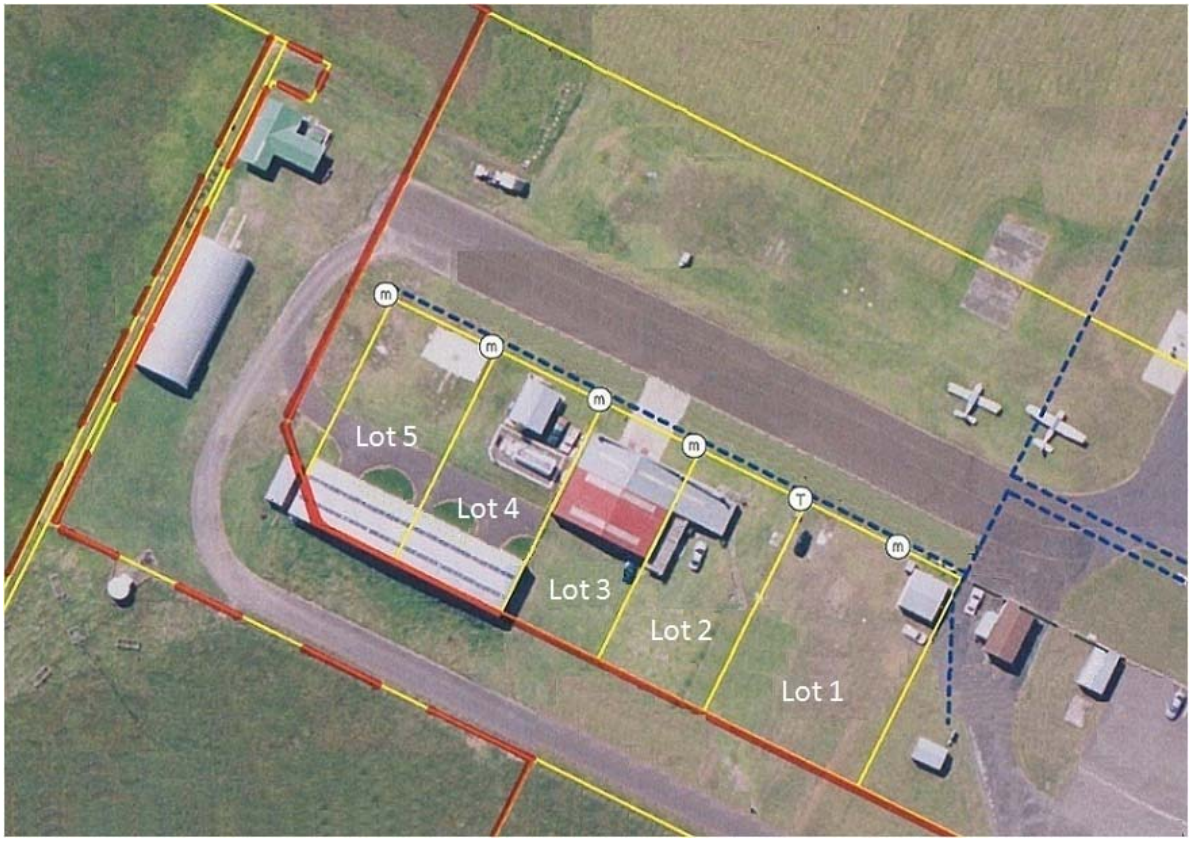
North-West Terminal and Business Park Complex
Concept Drawing

3.5 SITES FOR LIGHT AIRCRAFT HANGARS

3.5.1 GENERAL AVIATION

Existing Site (South-Central)

The airport has only six leasehold sites available for aircraft hangars as shown in the following aerial photograph.



Lots 4 and 5 have subsequently been re-subivided laterally. A near new hangar (photo 1) housing three aircraft is situated on the rear site and the front site (photo 2) is leased to an aerial topdressing company for open-air parking of topdressing aircraft plus a storage shed and above-ground fuel storage tank.

A large hangar (photo 3) is situated on Lot 3 with an office extension overlapping onto Lot 2.

A small office building is situated on Lot 1 (photo 4)

Utilisation of the leased areas is relatively inefficient given that there is a known demand for at least five hangar sites for the construction of new aircraft hangars.

If a decision is made to eventually re-site the main terminal complex, it is suggested that these leases be re-negotiated to achieve improved utilisation of this prime location.

It is also suggested that future applicants for leases be issued with a Licence to Occupy the site for say 12 months to allow adequate time for the construction of a hangar and that leases only be issued on receipt of building completion certificates.

Alternatively, a developer could be issued with a Licence to Occupy for the construction and sale of several hangars, with a lease issued to each purchaser on their respective settlement dates.

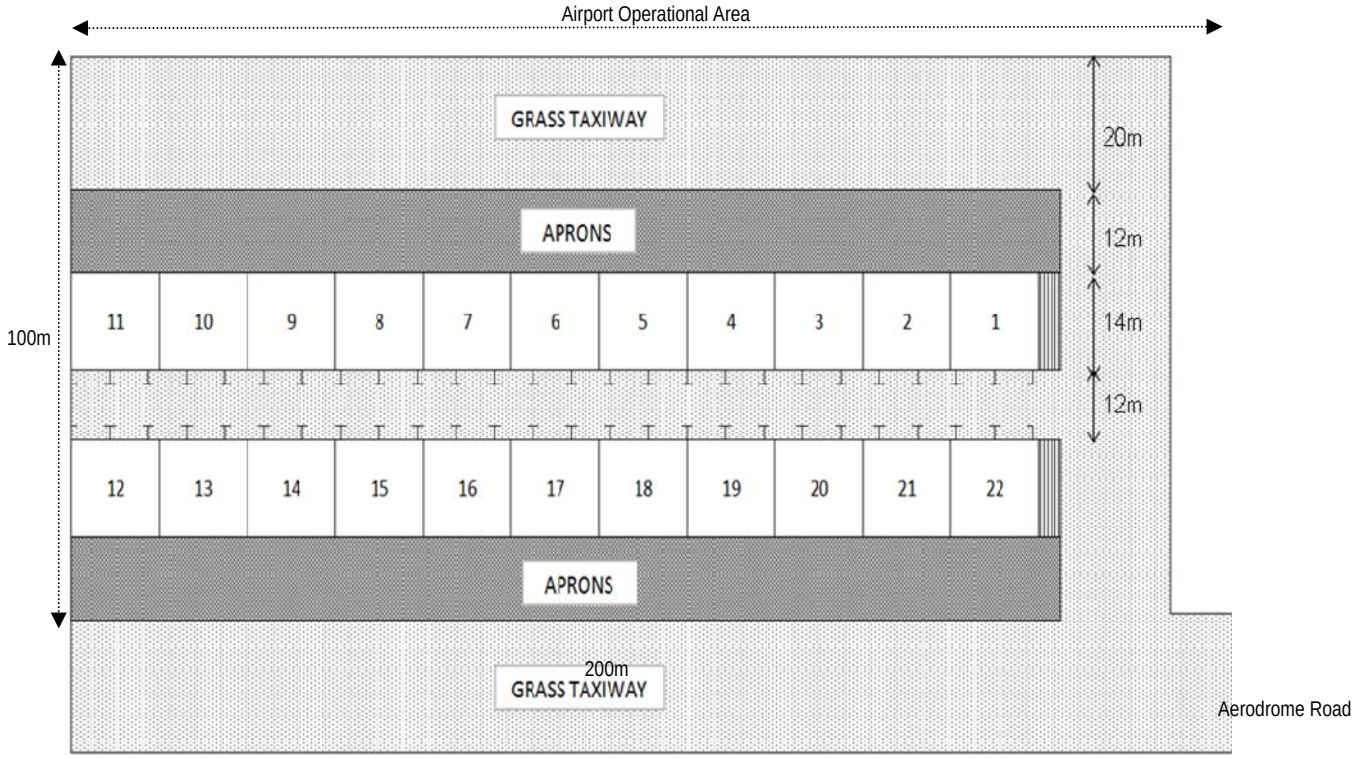
South-Central Extension

The shortage of hangar sites has led to a developer (who is also a commercial helicopter operator) initiating a proposal to construct up to 44 light aircraft hangars on a four hectare area immediately adjoining the existing terminal site. The diagram below shows the location of the proposed development.

The developer has been in discussion with the landowner who is apparently not interested in selling the land but is interested in the development proposal. It is understood that an application for resource consent is about to be lodged with the Whakatane District Council.

Any proposal will rely on the approval of the Airport Authority in terms of gaining access to the airport operational area. There are significant issues to be addressed by the Authority in considering such an application.

The proposal is to construct up to four rows each of eleven 16 x 14 metre hangars as the demand eventuates. The following artists impression and site diagram illustrate the first stage of the development which will occupy an area of two hectares.



This site is ideally positioned in terms of the existing grass runway and would be a natural continuation of the existing hangar site. Earthworks will be required to level both the site and the area of airport land immediately to the north of the site. The area of cut and fill required has yet to be calculated but is not expected to be excessive.

The proposed site is separated from the airport by a 20 metre-wide unformed legal road. In the event of this proposal being approved, it is recommended that the road be 'stopped' and the land vested in the Airport Authority.

Northern Site

The location of the northern site is shown in the diagram below.

The site is approximately 400 metres in length and would be suitable for a single row of up to 23 hangars 16 x 14 metres in size.

Levelling of the site would be necessary with a cross-fall not exceeding 1% from the main runway strip perimeter (i.e. 75 metres from the runway centreline) that would allow the finished hangar height to be within the 1:7 transitional side slope height limit or the 1:5 transitional side slope limit from the perimeter of the grass runway strip, whichever is the lesser.

A new grass runway would be required to avoid light aircraft crossing the sealed runway to access the existing grass runway. The existing gravel access road would need to be upgraded and diverted behind the hangar complex. Electricity and water supply, sewage treatment and disposal and a telephone line (for security and emergency services) would need to be considered for such a development.

South-Western Site

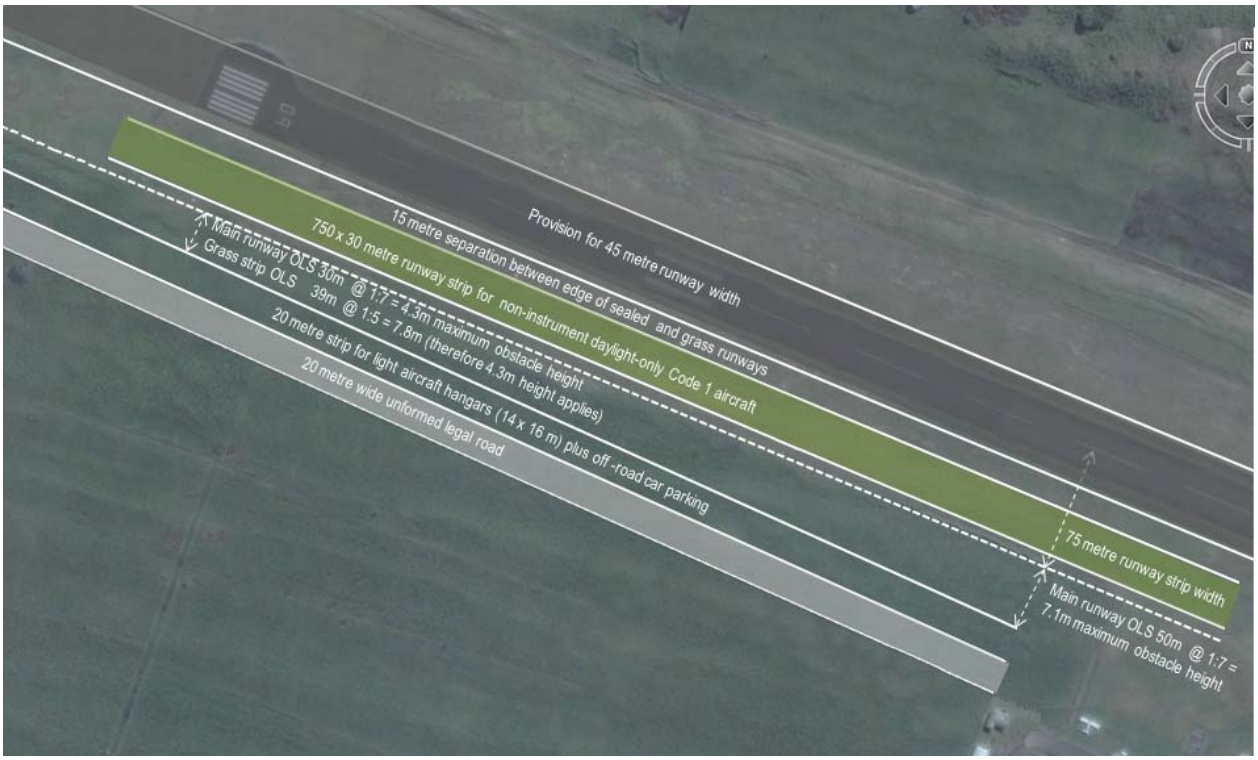
The south-western site is a long strip of land situated to the west of the existing terminal complex between the airports southern boundary and the existing grass runway as shown in the diagram on the following page.

The width of the strip narrows to the west by approximately 20 metres over a distance of 600 metres, which reduces the building height limit from 7 metres to 4 metres over that distance, provided that the site is graded to the same relative level as the airfield operational area (i.e. 6 metres above sea level).

Having regard to the building height limit it is estimated that the site could accommodate up to 17 light aircraft hangars of 16 x 14 metre dimensions. Considerable earthworks would be required to level the site. The quantity of cut and fill required has not been calculated.

Development of this site would require the formation of the unformed legal road alignment which follows the airport boundary line. The 20 metre strip shown on the attached diagram for hangar construction and parking allows for off-street angle parking for up to 6 vehicles on each lease.

Location diagram : South-West General Aviation Hangar Site



Site dimensions : South-West General Aviation Hangar Site

Development of the site would also require the repositioning of the aerodrome location beacon.

The site would require sewage treatment and disposal, electricity and water reticulation and a telephone connection for each hangar for access to security, fire monitoring and emergency services.

It is suggested that this option be the 'fall back' position in the event of the South-Central Extension not proceeding. This option would utilise the unformed legal road which runs parallel to the southern boundary.

This recommendation is based on the following –

- the sites proximity and ease of access to the existing grass runway
- ease of access via Aerodrome Road and the existing terminal complex

3.5.2 COMMERCIAL HELICOPTER HANGARS

South-East Site

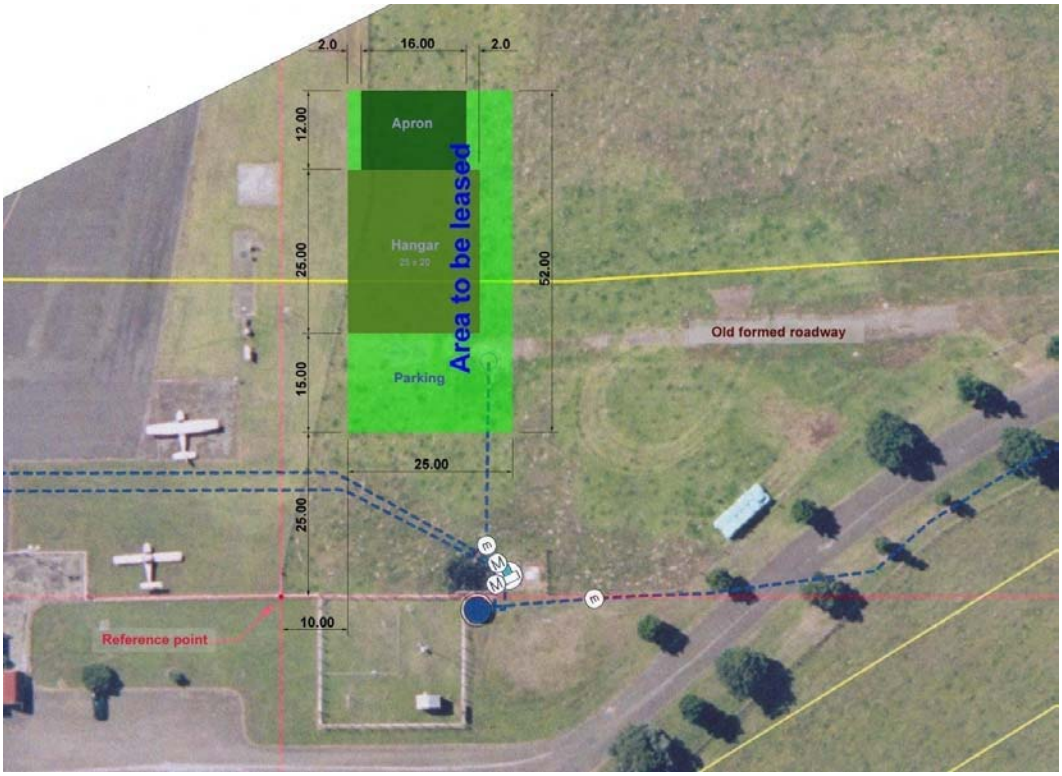
The immediate priority is to provide hangar sites for two commercial helicopter operators. The hangar size required is 25 metres (width) x 20 metres (length) with a stud height of 5 metres and a roof pitch of 11 degrees, with a north/south orientation of the ridgeline. This gives the building an overall height of 7.8 metres above ground level, allowing for the floor surface being 200mm above ground level.

Both operators have a strong preference to locate their hangars beside Aerodrome Road immediately to the east of the existing terminal complex. An application from one of the operators sought approval to locate a hangar immediately to the north of the weather monitoring station operated by the NZ Meteorological Service as shown in the diagram overleaf.

It was acknowledged that the proposal would compromise the accuracy of weather measurement with the likelihood that the weather station would have to be relocated to another site on the airport. The NZ Met Service have indicated that it is prepared if necessary, to relocate the station, but would require the applicant to meet the Met Services reasonable costs of doing so.

However, the area requested is also required for apron development in the event of the existing terminal being selected as the preferred site for the development of a new terminal complex. As the final decision is unlikely to be made on this issue until the prerequisite conditions have been satisfied, it has been necessary to find another site for the commercial helicopter hangars.

An area immediately to the east of that requested has been investigated. A desktop survey using AutoCad with GIS contour mapping has provided the measurements used in the following table.



Description	Deductions (metres)	Distances (metres)	Height Limits (metres)
Distance from runway centreline to road boundary		143.73	
Less distance from runway centreline to runway strip perimeter	75.00		
Distance from runway strip perimeter to road boundary		68.73	
Less building line distance from road boundary	0.00[10]		
Less building length (north/south)	25.00		
Net distance from runway strip perimeter to front of building		43.73	6.25
Net distance from runway strip perimeter to rear of building		68.73	9.82

The table shows that it is <u>not</u> possible to build hangars of the proposed size and height, <u>however</u>, if the hangars are rotated to an east/west alignment the transitional side slope height limits can be complied with as shown in the following table.

[10] *As the proposed building site is situated more than 9 metres from the legal road boundary the calculation is shown as zero.*

Description	Deductions (metres)	Distances (metres)	Height limits (metres)
Distance from runway centreline to road boundary		143.73	
Less distance from runway centreline to runway strip perimeter	75.00		
Distance from runway strip perimeter to road boundary		68.73	
Less building line distance from road boundary	0.00		
Less building width (north/south)	20.00		
Net distance from runway strip perimeter to front of building		48.73	6.96
Net distance from runway strip perimeter to centre ridgeline of roof		58.73	8.39
Net distance from runway strip perimeter to rear of building		68.73	9.82

Important Note: to achieve the above requrements the building platforms must be at the same or lower RL as the airstrip boundary.

This information will be made available to the operators to allow them to reconsider their requirements and decide whether their buildings can be realigned to suit the limitations of the site.

The following diagram shows the proposed hangar location (in blue), the measurements used in the above calculations and the cut and fill requirements to level the site to that of the airfield.

South-Central Extension

A fall-back position for the commercial helicopter opertators is to purchase standard 16(W) x 14(L) hangars in the proposed south-central extension.

It has been suggested that this may be a workable option subject to the 12 metre aprons in front of the commercial hangars being extended a further 20 metres to the north to provide adequate operational area. This would require Airport Authority approval to lease a section of the unformed legal road immediately to the north of the hangars.

Existing Terminal (South-Central)

In the unlikely event of the existing terminal site not being selected as the preferred location for a new terminal complex, a reconfiguration of Lots 1 and 2 would provide sufficient area for two 25(W) x 20(L) metre hangars or three 20(W) x 25(L) metre attached hangars suitable for commercial helicopter operations – as illustrated in the diagram below.

The diagram (right) shows the proposed location of the commercial helicopter hangars which could proceed if the existing site is no longer required for the development of a new terminal complex.

The diagram also shows the area required for a car park extension.

In order to optimise future site utilisation it is recommended:

- that in future, 'Licenses to Occupy' be issued until buildings are completed, with leases only being granted following receipt of a completion certificate for the approved building
- leases be issued for the building 'footprint' only in order to avoid problems associated with untidy and poorly maintained surrounds
- that a developer be engaged to develop rows of attached hangars of consistent quality and design in accordance with standards set by the Airport Authority, thereby enhancing the visual and commercial appeal of the development. This approach has worked successfully at other airports and has increased the demand for hangars.

3.5.3 COMMERCIAL FIXED-WING HANGARS

It is proposed that commercial fixed-wing aircraft operators purchase or lease standard hangars located within the light aircraft hangar park to be developed to the west of the existing terminal complex.

3.6 OPTION PREFERENCE RANKING

Primary Runway				
Preference Ranking	Description	Subject to -	Advantages	Disadvantages
1	1950 metre runway plus starter extensions	Designation and acquisition of private land Stopping of unformed legal road (western boundary) and provision of access via replacement unformed legal road along northern side of runway strip	Unrestricted 737 800 operations up to 2800kms Virtually no change in OLS over golf club Moves air noise boundary 200m further away from houses on Aerodrome Road Future-proofs airport capacity	Need to acquire land Need to relocate unformed legal road
2	1876 metre runway plus starter extensions	No conditions	No additional land required	4.8m reduction in height limit over golf course Design aircraft will have 10% load restriction on departures to Melbourne 30 metres short of landing distance required for design aircraft
3	Alternate orientation	Obstacle height survey (ridge south of Matata)	Flight path avoids Kohi Point ridge Eliminates adverse effects of aircraft noise Eliminates obstac/e height issues east of airport Straight-in approach on runway 25 Straight-out take-off path on runway 07	Possible need for circling approach runway 07 Likely high cost of airfield construction Volume of fill required for airfield construction Uncertainty of impact of environmental issues Risk of leaving airport capacity unprotected

Main Terminal Complex				
Preference Ranking	Description	Subject to -	Advantages	Disadvantages
1	Existing Site (South-Central)	Designation and acquisition of 3.5 hectares private and Crown land to be used for internal roads, car parking, fuel storage compound and related requirements	Ability to strengthen existing taxiways and aprons as an intermediate lower-cost option Timing of upgrades more easily managed Reduces risk of over-capitalising existing site Site directly accessible Access road and utility services already exist Ability to make low-cost infrastructure adjustments to accommodate growth in passenger numbers	Expansion constrained by availability of land
2	North-West Site	Resource consent for earthworks	Potential for future expansion	Cost of accessing and preparing
3	North-Central Site	Resource consent for earthworks		Cost of accessing and preparing

General Aviation Hangars				
Preference Ranking	Description	Subject to -	Advantages	Disadvantages
1	South-Central Extension	Designation and acquisition of 4 hectares private land Stopping and replacement of unformed legal road (southern boundary)	Close to existing grassed runway Adequate room for expansion (44 hangars) Fits well with existing terminal complex	The need to acquire 4 hectares land Cost of acquisition of land Requirement to 'stop' and replace unformed legal road
2	South-West Site	No conditions	Land owned by the Airport Authority	Almost too close to grassed runway Prevents widening of grassed runway
3	Northern Site	No conditions	Land owned by the Airport Authority	Requires formation of new grass runway on the northern side of the main runway Cost of runway formation Cost of upgrading access road Cost of utilities (electricity; telephone, water, sewage)

Commercial Helicopter Hangars				
Preference Ranking	Description	Subject to -	Advantages	Disadvantages
1	South-East Site	Applicants to survey proposed sites to confirm dimensions. Leveling of area between runway strip and Aerodrome Road	Separate from fixed-wing operations	Cost of leveling site Proliferation of hangar sites (aesthetics)
2	Existing South-Central Site	Re-development of existing terminal complex NOT proceeding Reorganisation of Lots 1 -3	Utilisation of existing terminal for tourism services Improved utilisation of existing leasehold titles	Decisions unlikely to be made in time to satisfy immediate demand for two hangars
3	South-Central Extension (GA Hangar site)	Designation and acquisition of private land Stopping of unformed legal road (southern boundary)	As a backup to the preferred option	Doesn't separate high use commercial helicopter operations from fixed wing activities

3.7 COST COMPARISON OF RECOMMENDED OPTIONS

Cost description	Costs common to both proposals	Costs exclusive to		Estimate of cost[11]
		North-West proposal	Existing Terminal proposal	
Designation and acquisition costs for 4 ha private land required for GA hangars	✓	-	-	
Designation and acquisition costs for 7.5 ha private land required for runway extension	✓	-	-	
Road stopping on southern boundary (fronting GA hangars) and provision of replacement access	✓	-	-	
Road stopping on western boundary (runway extension) and provision of replacement access	✓	-	-	
Designation and acquisition costs of 3.5 ha private land required for car parking, terminal, fuel farm	-	-	✓	
Legal road realignment (for construction of terminal building)	-	-	✓	
Runway extension and upgrade	✓	-	-	
New or replacement taxiway from primary runway to aprons	✓	-	-	
Construct six new aprons for design aircraft	✓	-	-	
Emergency water storage	✓	-	-	
Scrubbers for contaminated water from aprons	✓	-	-	
Full landscape plan	-	✓	-	
Partial landscape plan	-	-	✓	
Install 3 phase power supply line	-	✓	-	
Install perimeter security fence	✓	-	-	
Relocatable departure gate lounge (existing terminal)	✓	-	-	
New terminal building	✓	-	-	
New rescue fire station and emergency control centre	✓	-	-	
1000 vehicle car park c/w automatic parking control system	✓	-	-	
Temporary car park extension (70 vehicles) for existing terminal	✓	-	-	
Temporary rescue fire station servicing existing terminal complex	✓	-	-	
Sealed main access road (2000 metres)	-	✓	-	
Site earthworks	-	✓	-	
Water supply line	-	✓	-	
Sewage treatment and disposal	-	✓	-	
Jet blast deflector shield				
Relocate Meteorological Service weather station	-	-	✓	
Compensation for termination of existing leases	-	-	✓	
Demolition of existing terminal building	-	-	✓	

[11] *NOTE: Costs NOT to be used for budgeting purposes. Estimates are based on authors previous experience and knowledge and are only provided as a broad view of airport development costs and should not be used for any other purpose.*

3.8 OPTION SELECTION PROCESS

The recommended 'preferred' option mix is: –

1. the 1950 metre runway
2. re-development of the existing terminal complex
3. development of a four hectare light aircraft hangar park adjoining the existing terminal complex

As each of these options is dependent on the acquisition of private land - and two are also dependent on 'stopping' and vesting sections of unformed legal road, the following process is recommended for arriving at the most preferred 'achievable' mix of options.

This is a 'step down' process which considers the next available preference-mix where the previous mix cannot be achieved. All of the 'ticked' requirements must be achievable for that preference to proceed, with the exception of the 2nd and 3rd options for the light aircraft hangar park, provided that the requirements for the 1st option have been met.

Preference Mix	Pre-requisite requirement checklist		
	Road stopping confirmed	Land acquisition confirmed	Additional site development costs acceptable
1st Preference Option-Mix			
· 1950m runway extension including additional land acquisition	✓	✓	
· Re-development of the existing terminal complex		✓	
· Light aircraft hangar park –			
1. adjoining the existing terminal complex; or	✓	✓	
2. south-west site			
Note: Requires termination of existing leases (Lots 1-5) prior to re-development of existing terminal complex (likely to be several decades from now)			
2nd Preference Option-Mix			
· 1950m runway extension including additional land acquisition	✓	✓	
· Development of north-west terminal complex			✓
· Light aircraft hangar park –			
1. adjoining the existing terminal complex; or	✓	✓	
2. south-west site			
· Bonus light aircraft facility utilising existing terminal complex			
· Bonus retention of existing leases (lots 1-5)			
3rd Preference Option-Mix			
· 1950m runway extension including additional land acquisition	✓	✓	
· Development of north-central terminal complex			✓
· Light aircraft hangar park –			
1. adjoining the existing terminal complex; or	✓	✓	
2. south-west site			
· Bonus light aircraft facility utilising existing terminal complex			
· Bonus retention of existing leases (lots 1-5)			

4th Preference Option-Mix			
· 1876m runway extension achievable within existing boundary			
· Re-development of the existing terminal complex		✓	
· Light aircraft hangar park –			
1. adjoining the existing terminal complex; or	✓	✓	
2. south-west site			
Note: Requires termination of existing leases (Lots 1-5) prior to re-development of existing terminal complex (likely to be several decades from now)			
5th Preference Option-Mix			
· 1876m runway extension achievable within existing boundary			
· Development of north-west terminal complex			✓
· Light aircraft hangar park –			
1. adjoining the existing terminal complex; or	✓	✓	
2. south-west site			
· Bonus light aircraft facility utilising existing terminal complex			
· Bonus retention of existing leases (lots 1-5)			
6th Preference Option-Mix			
· 1876m runway extension achievable within existing boundary			
· Development of north-central terminal complex			✓
· Light aircraft hangar park –			
1. adjoining the existing terminal complex; or	✓	✓	
2. south-west site			
· Bonus light aircraft facility utilising existing terminal complex			
· Bonus retention of existing leases (lots 1-5)			
7th Preference Option-Mix			
Reduced runway extension to maintain obstacle height at eastern boundary			
· Re-development of existing terminal complex		✓	
Light aircraft hangar park –			
1. adjoining the existing terminal complex; or	✓	✓	
2. south-west site			
Note: Requires termination of existing leases (Lots 1-5) prior to re-development of existing terminal complex (likely to be several decades from now			
8th preference option-mix			
· Reduced runway extension to maintain obstacle height at eastern boundary			
· Development of north-central terminal complex			✓
Light aircraft hangar park –			
1. adjoining the existing terminal complex; or	✓	✓	
2. south-west site			

9th preference option-mix	No prerequisite requirements		
· Reduced runway extension to maintain obstacle height at eastern boundary			
· Development of existing complex without purchase of additional land			
Light aircraft hangar park –			
1. south-west site			
Note: Requires termination of existing leases (Lots 1-5) prior to re-development of existing terminal complex (likely to be several decades from now)			

4 IMPLEMENTATION PLAN

Whakatane Airport would benefit from the capability to extend its runway to an optimum length of 1950 metres plus starter extensions in order to provide a take-off distance of at least 2200 metres and a landing distance of 1950 metres in both directions.

This would allow unrestricted non-stop operation of the design aircraft over distances of up to 2800 kilometres, which is the approximate straight-line distance between Whakatane and Melbourne.

An additional 8.0 hectares of land (320m in length x 250m in width) is required at the western end of the runway in order to achieve the optimum length. This area includes a section of unformed legal road which will need to be 'stopped' and the land vested in the Airport Authority for this option to proceed. It is recommended that the 8 hectares be designated for airport purposes.

The existing terminal complex requires an additional 3.5 hectares of adjoining land in order to accommodate the essential infrastructure required for the airport to achieve its ultimate potential. This does not include the 2 hectares of adjoining land required for Stage 1 of the proposed light aircraft hangar park.

The planning process investigated two other possible sites for the location of a new terminal complex. While both of those sites have more than adequate land for any future expansion requirements, the logistics of managing the change and the requirement to commit a large amount of capital in one 'lump' sum to facilitate that change has weighed the recommendation in favour of the existing site, provided that sufficient land adjoining the existing sitecan be acquired to meet the minimum requirements for the new terminal complex.

It is therefore proposed that the terminal complex remain at its present location subject to the acquisition of at least 3.5 hectares of adjoining land (excluding that required for a light aircraft hangar park). The priority must be to designate the 3.5 hectare area to ensure that the Airport Authority can acquire that land as and when required – which is likely to be several decades away.

In the event of the 3.5 hectares of land not being acquired, it is proposed that the terminal continue at its present location until the 'trigger point' is reached and it is necessary to develop a new terminal complex on the north-western site. The existing terminal complex should then be utilised as a commercial light aircraft facility for aircraft of less than 5,700 kilograms.

The existing terminal will need to cater for growth in passenger numbers until the 'trigger point' is reached for the development of a new terminal complex. It is proposed terminal capacity be expanded by the addition of relocatable modules which can subsequently be moved and utilised for another purpose.

The following diagram illustrates the transitional management of the existing terminal complex.

Area 1 the dotted blue line shows the perimeter of the six aprons to be constructed during the redevelopment programme. All existing and any new structures within this area will need to be demolished or relocated when development commences.

Area 2 is the existing terminal building

Area 3 is the site reserved for any extension/s to the existing terminal building

Area 4 is the area reserved for an extended public car park

Area 5 is the site reserved for the rescue fire station

Area 6 is the site reserved for two commercial helicopter hangars

Area 7 is the area from which 3.5 hectares of land is required for the development of the new terminal complex

Area 8 is the site for Stage 1 of the proposed light aircraft hangar complex

Area 9 is the site for Stage 2 of the proposed light aircraft hangar complex

4.1 AIRPORT LAND TENURE

Whakatane Airport consists of two Certificates of Title. The larger CT 60A/447 has an area of approximately 226 hectares and the smaller CT59B/897 has an area of approximately 2.9 hectares.

In May 1958 a Gazette Notice set apart the land as a reserve for aerodrome purposes pursuant to the Land Act 1948 and vested the reserve in the Whakatane District Council in trust for that purpose pursuant to the Reserves and Domains Act 1953. In October the same year (1958) an Order-in-Council consented to the establishment and maintenance of an aerodrome on that land by the Whakatane District Council.

In October 1972 a Gazette Notice vested the land in the Airport Authority in its trust for aerodrome purposes pursuant to the Reserves and Domains Act 1953.

In November 1999 the land was leased to the Whakatane District Council for a term of 99 years terminating on 2nd November 2098.

The Council's limited leasehold tenure of the land may affect the Airport Authorities ability to offer leases with sufficient length of tenure within the proposed airport business park complex. Lessees investing in expensive permanent improvements may require a greater length of tenure than the Council is able to offer. This aspect needs to be clarified and if necessary remedied.

4.2 STATE OF READINESS

The probability is that it will be several decades before the runway needs to be extended, strengthened and perhaps widened to meet the take-off and landing requirements of larger aircraft. However, the demand for an upgrade could arise at any time and the need to move quickly may be imperative. An airport which knows its capabilities and is ready to capitalise on opportunities is more likely to succeed that an airport which is not in a position to respond.

An airport which has achieved a "state of readiness" is also more likely to be pro-active in seeking out opportunities for expansion and growth – and is more likely to have a marketing strategy to achieve those objectives.

Having the investigation, research, planning and design phases completed before an opportunity arises is a tremendous advantage in terms of credibility and response time.

While air transport services are highly mobile and airlines can and do withdraw services with very little notice, airports are by their nature slow to act and owners have to think carefully before investing large sums of capital in improvements which are reliant on the continued patronage of a very small number of substantial customers.

A good example of this was Air New Zealand's announcement late last year of its decision to close down its budget airline subsidiary Freedom Air within six months. At that time Freedom Air was the only international carrier servicing Hamilton, Palmerston North and Dunedin Airports, all of which had invested heavily in infrastructure development for international services.

Airports must weigh their risks carefully before investing capital, but should have their homework done and be ready to respond quickly where an opportunity arises. Being ready to act is a very good position to be in.

Investigation and research

Geotechnic testing of runway sub-grade materials is necessary to determine the quantity of excavation required and the type of fill necessary to achieve the required strength and surface deflection characteristics.

The location of fill sources and testing and securing those sources is of vital importance, particularly where resource consents are required to obtain that fill.

Planning and design

Design of the runway strip, runway, taxiways, aprons, stormwater system, electricity reticulation and scrubber systems for the removal and disposal of water contaminants is work that should be completed at the earliest opportunity in order to avoid any unnecessary delay in the event of an opportunity arising. This work is also useful as a basis for cost estimates and marketing purposes.

Cost estimates

A series of cost estimates reflecting the level of knowledge and certainty as to costs are necessary to enable the shareholder owners to make provision for the capital required to undertake the development.

Contract documentation

The preparation of draft contract documentation and tender specifications allows work to proceed quickly following agreement being reached on a new opportunity.

Consultation with affected parties

Consultation with affected parties can be a time consuming requirement. Initiating that consultation well in advance of the project allows greater opportunity to address any issues which may arise and hopefully develops a relationship of understanding and trust which benefits the proposal.

4.3 PROTECTION OF AIRPORT CAPACITY

The key requirements for protecting airport capacity are the designation of flight paths and obstacle limitation surfaces; and district planning policies and rules which ensure compatible land use activities in close proximity to airports and the exclusion of noise sensitive activities from areas which would otherwise curtail airport operations and expansion.

Air Noise Boundaries

Noise is the most significant adverse effect of aircraft movements on properties located close to an airport or beneath the airports approach and take-off paths. The most common objection to airport expansion and capacity utilisation is a proposed increase in aircraft noise.

New Zealand Standard 6805 is used by territorial authorities and regional government for the control of airport noise. It establishes maximum acceptable levels of aircraft noise exposure around airports for the protection of community health and amenity values whilst recognising the airports need to operate efficiently. It provides a guide for territorial authorities wishing to include appropriate land use controls in their district plans, as provided for in the Resource Management Act 1991.

The Standard uses an air noise boundary mechanism for local authorities to establish compatible land use planning and set limits for the management of aircraft noise at airports where noise control measures are needed to protect community health and amenity values.

The approach advocates the implementation of practical land use planning controls and airport management techniques to protect the health of people living and working near airports, without unduly restricting airport operations.

The Standard establishes maximum levels of aircraft noise exposure at air noise boundaries. This is expressed as a 24 hour daily sound exposure averaged over an agreed period, which is normally three months. It also establishes a second and outer control boundary for the protection of amenity values, and prescribes the maximum sound exposure from aircraft noise at the outer control boundary, within which there should be no new incompatible land uses. It requires that consideration be given to individual maximum noise levels from aircraft during any proposed night-time operations.

The Standard suggests that noise control measures are necessary where the exposure of residential communities exceed 100 pasques (or an Ldn of 65) and may be necessary where exposure exceeds 10 pasques (or an Ldn of 55). Tables 18 and 19 below prescribe compatible land uses at different levels of sound exposure for those areas in the immediate vicinity of an airport.

Recommended Noise Control Criteria For Land Use Planning Inside The Air Noise Boundary		
Sound exposure Pa^2s(1)	Recommended control measures	Day/night level
>100	New residential, schools, hospitals or other noise sensitive uses are prohibited. Steps shall be taken to provide existing residential properties with appropriate acoustic insulation to ensure a satisfactory internal noise environment. Alterations or additions to existing residences or other noise sensitive uses shall be permitted only if fitted with appropriate acoustic insulation.	>65
>350	Consideration should be given to purchasing existing homes, or relocating residents, and rezoning the area to non-residential use only.	>70
>1000	There is a high possibility of adverse health effects. Land shall not be used for residential or other noise sensitive uses.	>75

Note –
(1) Night-weighted sound exposure in pascal-squared-seconds or "pasques".
(2) Daylight level (Ldn) values given are approximate for comparison purposes only and do not form the base for the table.

Recommended noise control criteria for land use planning inside the outer control boundary but outside the air noise boundary		
Sound exposure Pa^2s(1)	Recommended control measures	Day/night level
>10	New residential, schools, hospitals or other noise sensitive uses should be prohibited unless a District Plan permits such uses, subject to a requirement to incorporate appropriate acoustic insulation to ensure a satisfactory internal noise environment. Alterations or additions to existing residences or other noise sensitive uses should be fitted with appropriate acoustic insulation and encouragement should be given to ensure a satisfactory internal environment throughout the rest of the building.	>65

Note –
(1) Night-weighted sound exposure in pascal-squared-seconds or "pasques".
(2) Daylight level (Ldn) values given are approximate for comparison purposes only and do not form the base for the table.

Locating air noise and outer control boundaries

The Standard recommends –

a) that projections of future aircraft operations be made to determine the 10, 35,100, 350 and 1000 Pa^2s (or 55, 60, 65, 70 and 75 Ldn) sound exposure contours;

b) that a minimum 10 year period be used as the basis of the projected contours;

c) that the boundary locations be estimated for planning purposes using the FAA Integrated Noise Model (INM) or other appropriate model;

d) that future airport operations be projected in terms of:

    a. aircraft types (current and future);

    b. flight frequencies by aircraft type, time of day, runway use and approach/departure tracks, landing and take-off profiles, and strip lengths;

    c. variations in airport operations within a year (e.g. due to seasonal effects);

    d. current and future runaway capacity and any proposed airport development.

e) that account also be taken of:

    a. navigation system accuracy and limitations;

    b. aircraft operational noise abatement procedures;

    c. any available noise monitoring data;

f) that the preliminary assessment of location of the sound exposure contours and the proposed air noise boundary be carried out in consultation with the airport operator, local authority and other interested parties;

g) that only noise resulting from aircraft operations be considered when determining sound exposure contours and the air noise boundary;

h) that in the planning stages, the sound exposure predictions be based on an average day calculated from all operations during the busiest three months of the year;

i) that night-time operations be considered in establishing the air noise boundary;

j) that the local authority consider whether those contours would be a reasonable basis for future land use planning taking into account:

    a. the time frame of the projection;

    b. the extent of non-compliance of existing land uses with Table 19;

    c. the impacts, including economic, social, health and safety of airport development on surrounding land use;

    d. national, regional and local development, and national and international transportation requirements;

    e. the effects of aircraft noise on the welfare, amenity values and health of any affected community;

    f. the effect of the contours on existing aircraft operators' flexibility to meet the community's demand for services in a commercially and economically viable way;

    g. New Zealand's obligations to international standards relating to aircraft noise emissions, and programmes to phase out noisier aircraft types;

    h. the costs and benefits of land use controls, based on the air noise boundary, compared to other options which would achieve the same objective of managing the adverse effects of airport noise,

k) that after considering the matters specified above, the local authority incorporate a map into its District Plan showing the projected sound exposure contours, including the air noise boundary and outer control boundary.

In order to calculate noise contours which reflect the future capacity of the airport it is necessary to forecast the maximum number of aircraft movements which are likely to occur at some time in the future.

Marshall Day Acoustics have prepared the noise contours shown in the diagram below which is based on Whakatane Airport's 'optimum' capacity within existing boundaries and a runway length of 1950 metres and 270 metre starter extensions at each end of the runway.

The 'optimum' capacity is based on a comparative analysis of New Zealand airports which currently have runways of between 1800 and 2200 metres which have a mix of domestic turboprop and jet trans-Tasman services or are close to achieving that level of activity. The hypothetical schedule of aircraft movements derived from that analysis and on which the noise boundaries are calculated is shown in the following table.

The most relevant physical capacity which can be defined for an airport is the maximum number of aircraft movements per hour which can be achieved given the constraints of the runway configuration and the air traffic control system. Except in the case of the very busiest major international airport hubs is it likely that the physical capacity based on maximum movements per hour over a 24 hour period would ever come even close to being realised, therefore it would be totally unrealistic to define and protect such a capacity.

The mix of aircraft used in the calculation of the noise contours is based on what is currently in use at other New Zealand airports. As the noise cause by each successive model reduces over time through improved engine and airframe design, the number of movements required to generate the same total 'quantity' of noise will increase.

The only variable in the equation that is 'fixed' by the air noise boundaries is the total quantity of noise which an airport may allow in a given period in the conduct of its business. The number or type of aircraft movements required to generate that noise is not restricted.

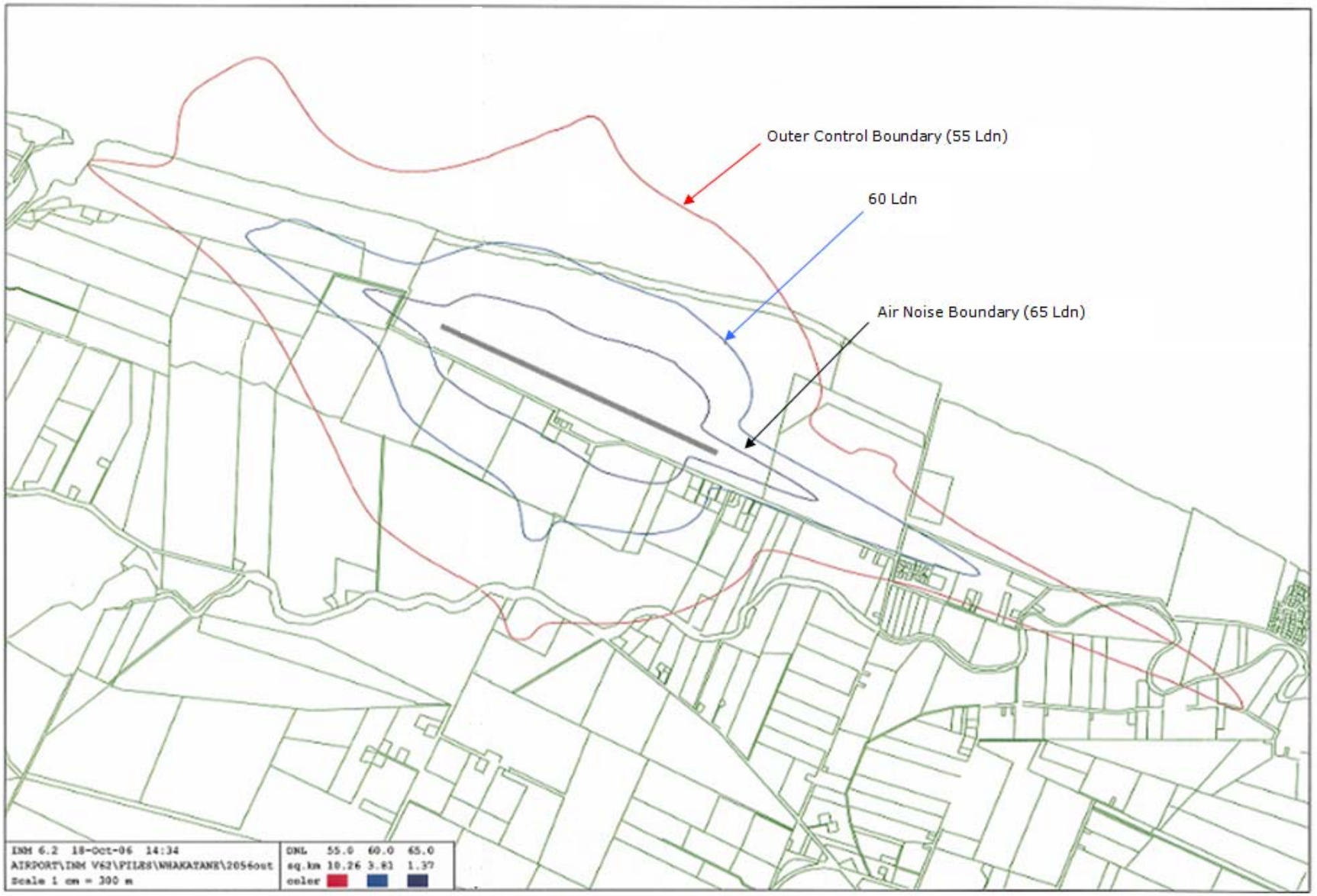
Aircraft Type	Average Arrivals Per Day	Average Movements Per Day	Capacity-based forecast	
			1950m runway	
			Total Movements Per Year	% Night Movements
Boeing 737 800	10	20	7,300	33%
Boeing 737 300	2	4	1,460	10%
Aerospatiale ATR72	7	14	5,110	10%
Bombardier Dash 8 Q300	2	4	1,460	10%
Fokker Friendship F27	1	2	730	100%
GA Twin-engine fixed-wing	8	16	6,000	15%
GA Single-engine fixed-wing	27	55	20,000	15%
Helicopter	11	22	8,000	15%
Totals	69	137	50,060	

New Zealand Standard 6805 on Airport Noise Management and Land Use Planning recommends that new residential development or other noise sensitive activities be prohibited within the Air Noise Boundary.

Following confirmation that the section of unformed legal road and the private land required for the runway extension is available for acquisition at the appropriate time, it is recommended that Marshall Day Acoustics be engaged to re-calculate the noise boundaries based on the preferred runway configuration.

This represents a total of 50,000 movements per annum including 16,000 scheduled airline services and 34,000 general aviation movements. This compares with Palmerston North Airport which currently has 22,000 scheduled and 30,000 general aviation movements per annum.

The following diagram shows noise contours based on the above aircraft movements from runway Option 2.1 located within the existing boundaries of the airport.


Outer Control Boundary (55 Ldn)
60 Ldn
Air Noise Boundary (65 Ldn)
INM 6.2 18-Oct-06 14:34
AIRPORT\INM V62\PILRS\WHAKATANE\2056out
Scale 1 cm = 300 m
DNL 55.0 60.0 65.0
sq.km 10.26 3.81 1.37
color

Flight Paths and Obstacle Limitation Surfaces

The protection of airspace required for aircraft to approach the airport runway and to take-off and climb to the required cruising altitude is essential to the operation of the airport.

Flight path protection for the proposed extended runway is provided by defining obstacle limitation surfaces (OLS) in accordance with –

a) CAA Advisory Circular AC139-06A

b) ICAO Annex 14 – Aerodromes and ICAO Procedures for Air Navigation Services (PANS OPS). Table 3 shows the proposed specifications of the OLS.

Obstacle limitation surfaces are designed to provide obstacle-free paths for any multi-engined aircraft which lose the power of an engine during take-off.

c) Western flight paths

These are quite straight forward as there are no significant obstacles to the north. A straight in approach on runway 09 and a straight-out departure on runway 27 are provided for.

d) Eastern flight paths

The eastern flight paths are affected by the terrain of the Kohi Point bluff to the east of Whakatane township. The bluff, which lies on the extended runway centreline approximately 8km from the eastern threshold, requires a geometric gradient from the proposed eastern OLS origin of approximately 1.8% to clear the 150m AMSL spot height on the northern end of the point. If the 183m AMSL spot height to the south of the extended centreline is included the geometric gradient increases to 2.16%.

For this reason the eastern flight paths diverge to the north from a point 5000m from the eastern surface origin. The angle of divergence is 14.9 degrees enabling the approach to be classified as a "straight in" instrument approach. This has advantages with regard to operating minima.

To achieve optimum minima this approach would either have to be serviced by an ILS located on the divergence line (see attached figure I-4-5-1 from PANS OPS Vol 2), or a RNP/GNSS approach would have to be defined[12].

Airways Corporation would have to determine the minima available with this approach but Astral is confident (subject to a survey check of the terrain) that minima considerably lower than the current "Cat C" NDB/DME circling minima of 870ft AGL and 3700m forward visibility could be obtained.[13]
Both paths originate from a point measuring 60 metres beyond the physical end of the runway, and have an upslope of 2% - or one metre rise for every 20 metres in distance. The upslope is known as the obstacle limitation surface.

[12] RNP/GNSS (required navigation performance) approaches utilise a combination of GPS, on board inertial and ground based navigation to provide the position of the aircraft on approach to a very high level of confidence. RNP approaches are generally confined to modern jet aircraft such as the B737-800 and A320, although very modern turbo-prop aircraft such as the Bombardier Q400 may have the capability. RNP approaches are currently in use by Qantas and Air New Zealand at Queenstown airport.

[13] The current approach aid is a non-directional beacon (NDB) supplemented by distance measuring equipment (DME). This provides a non-precision circling approach to runway 09.

It is the airports responsibility to ensure that obstacles do not intrude this surface. While the CAA recommended slope is 1.6% (an upslope of 1 metre in every 62.5 metres) it is proposed that the maximum 2% be used in order to achieve the straight-in approach described above and to reduce the adverse effects the proposed runway extension will have on the golf club.

The following table shows the specifications for the obstacle limitation surface from each end of the extended runway.

Takeoff and approach OLS specifications

runway end	OLS	upslope	inner edge width m	splay	turn point from origin m	turn angle	surface length m	final width m
western	takeoff	1.60%	180	12.50%	-		15000	1200
western	approach	2.00%	150	15.00%	-		15000	4650
eastern	takeoff	2.00%	180	12.50%	5000	north 15 deg	15000	1200
eastern	approach	2.00%	150	15.00%	5000	north 15 deg	15000	4650

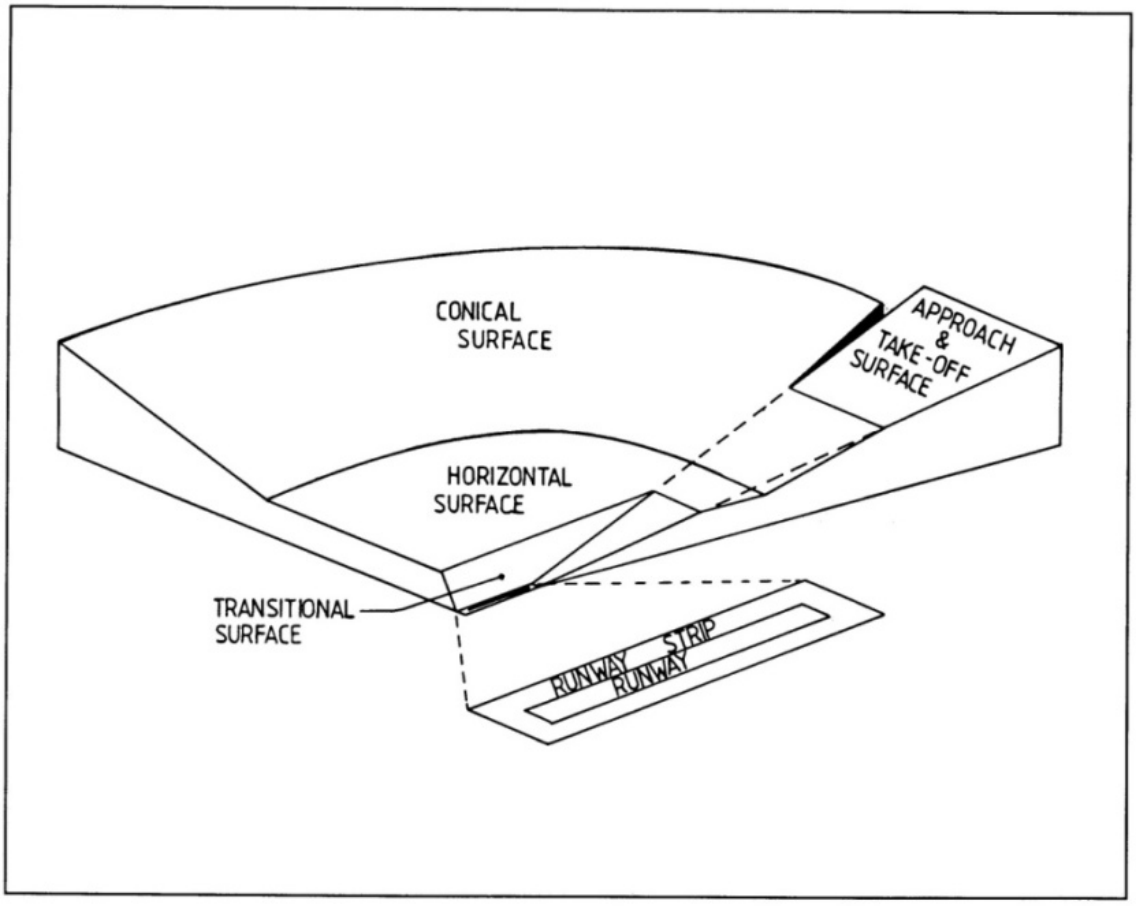
e) Transitional side surface, inner horizontal surface and conical surface

These surfaces are prescribed in AC139-06A for code 3 and 4 aircraft, which includes the A320 and B737-800. The surfaces are intended to protect aircraft circling in the vicinity of the airport.

The OLS for the transitional side surface slopes up and outwards from the edges of the strip at an angle of 1V:7H until a height of 45m above the aerodrome is reached.

The OLS for the inner horizontal surface extends at a height of 45m outwards a distance of 4000m from the strip edges.

The conical surface OLS extends from the outer edge of the horizontal surface upwards and outwards to a distance of 2500m from the outer edge of the inner horizontal surface.



Public Safety Areas

The Civil Aviation Authority is responsible for setting, monitoring and enforcing safety standards to minimise the risk of death or injury to persons travelling on any New Zealand registered aircraft or any aircraft operating within New Zealand.

It is the responsibility of Local Authorities to minimise the risk of death or injury to persons on the ground resulting from aircraft operations.

Assessment of risk is both complex and difficult. One of the most comprehensive documents on the subject is a handbook published by the Californian Department of Transport Aeronautics Division. The 400 page document is entitled "Airport Land Use Planning Handbook" and deals with airport land use compatibility planning.

Two global databases record all air transport accidents throughout the world. The following table summarises the number of fatal accidents which have occurred on or near airports over several decades. One of the databases has been operating for 60 years.

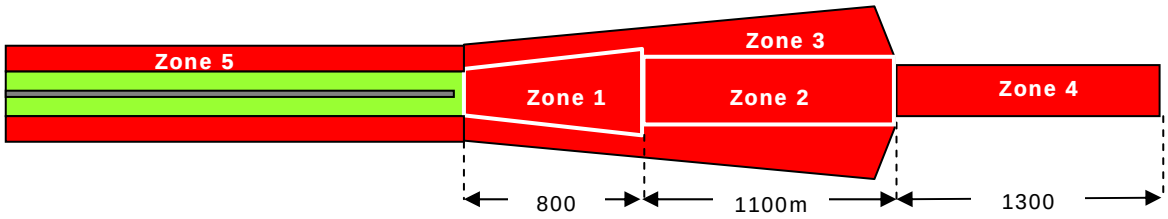
Summary of Analyses of Accidents & Fatalities On or Near Airports			
	Database 1	Database 2	Variance
Accidents	63%	68%	5%
Fatalities	56%	40%	16%

The analyses show that two thirds of all aircraft accidents occur on or near an airport during landing or take-off. This emphasises the importance of competent land use compatibility planning near airports in order to minimise the risk of injury and/or death in the event of an accident.

The Handbook contains valuable guidance for local authorities involved in protecting the public against the adverse effects of airport operations.

Its wide-ranging analysis of aircraft accidents establishes that specific areas adjacent to airports are at greater risk of death, injury or property damage as a result of an aircraft accident.

The manual defines a number of zones where that risk is sufficient to warrant restrictions being placed on the use of that land and more specifically, the maximum population density which is appropriate within each zone. The following diagram shows the location of each zone in relationship to an airport runway. The table following the diagram describes the assessed level of risk for each zone and the guideline for population density.

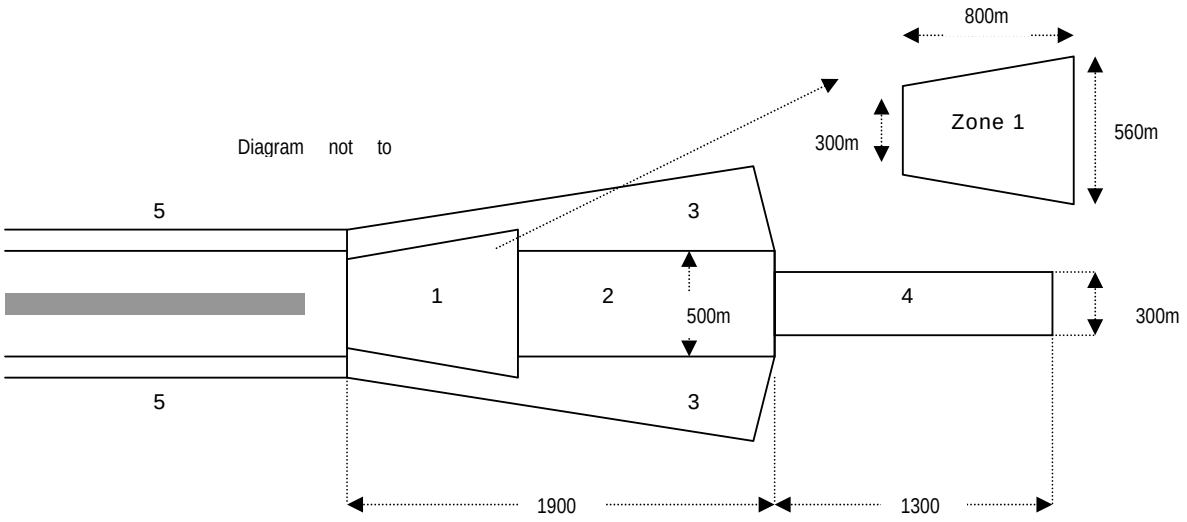


The most vulnerable area is the first 800 metres from the runway-end. This includes the 300 metre runway end safety area (RESA) recommended by the International Civil Aviation Organisation. While RESA's are clearly important in reducing the risk to passengers and crew in the event of an aircraft accident, its primary purpose is to reduce the risk of damage to an aeroplane in the event of a runway undershoot or overrun. In other words, the length of the RESA was not based on the risk of death and injury to passengers and crew, nor is it based on the risk to public safety.

Safety Compatibility Zone details

Safety Compatibility Zones		Accident Risk	Accident Rate	Distance from runway (metres)	Land Use Density Guidelines
1	Runway Protection Zone	Very High	30-50% of all aircraft accidents	0 - 800	No dwellings
2	Inner Approach/Departure Zone	Substantial		800 - 1900	1 dwelling per 4-8 ha
3	Inner Turning Zone (Light Aircraft)		Primarily applicable to general aviation airports	0 - 1900	1 dwelling per 1-2 ha
4	Outer Approach/Departure Zone		Zone can be reduced or eliminated where activity is low	1900 - 3200	1 dwelling per 1-2 ha
5	Sideline Zone			-	1 dwelling per ½-1 ha

The following diagram describes the dimensions of the various zones for a large air carrier runway.



Zone 1 has a total area of 32 hectares. The recommended maximum housing density is 1 dwelling unit per 6 hectares or a total of 5.3 dwelling units over the total area. At an average 2.5 persons per dwelling unit this equates to a total population of 13 persons resident within the zone. This density is not dissimilar to that of the Kiwi 10 acre rural lifestyle block.

Given that the height of an obstacle limitation surface at a 1.6% upslope is only 11.8 metres above the height of the runway at a distance of 800 metres from the runway end, and that the actual approach height of an aircraft at the same point is 57 metres above the runway level, residential dwellings located within this zone would be subject to significant adverse effects caused by low flying aircraft. This possibly why most airports established in the 1960's were equipped with a kilometre of land beyond each end of the runway formation.

It is therefore recommended that a public safety zone be established in the District Plan measuring 300 metres in width and immediately adjoining the runway end safety areas at each end of the runway and following the extended centreline of the runway for a distance of 500 metres. When combined with the length of the RESA, this provides an actual safety zone of 800 metres in length. It is recommended that the housing density within the zone be restricted to one dwelling unit per 6 hectares.

Protection mechanisms

Designation

The primary advantage of designation is that it protects the use of that land for the specified purpose and gives that use priority over any other public work for which designation may subsequently be sought.

- *Designation of Airport-owned land*

  The land which comprises Whakatane Airport is already designated for airport purposes and has an underlying zoning of Rural 3.

  It is understood that the designation does not specify the permitted land uses and is therefore open to interpretation as to whether a particular use is permitted in terms of the designation, or whether it continues to be subject to the District Plan Rules for the Rural 3 zone.

- *Designation of privately-owned land*

  A possible disadvantage of a designation is that land owners adversely affected by the designation may in certain circumstances take action under sectio 185 Resource Management Act 1991 to compel the Requiring Authority to purchase that land. In some instances such a requirement may be an advantage.

- *Designation of airspace*

  It is understood that the designation of an area of land or sea includes the column of airspace above that land. Therefore a designation for a road allows the Requiring Authority to erect structures into the airspace above that road.

  This is an area with potential for conflict between public utilities competing for the same airspace. Examples of such conflict include a designation for a motorway overpass which will intrude the approach surface of a planned runway extension, highway lights which intrude approach paths and the flare from an offshore oil-rig which intrudes the approach path to an existing airport. In each case a prior designation would have protected the airport from such intrusions.

  Without designation, the proposed approach path over Kohi Point ridge could be vulnerable to a designation for say the construction of a communications tower.

District Plan

The inclusion of obstacle height limits in a District Plan provide adequate and effective protection of obstacle limitation surfaces provided that the Local Authority is diligent in the application and enforcement of those height controls, particularly when issuing consents. There are numerous examples of problems which have arisen at other airports which have only been resolved by compromising the airports position.

The problem with the District Plan provisions is that the applicant for consent is not automatically required to consult with the Airport Authority before being issued with that consent. In the case of a designation, the onus of responsibility clearly rests with the applicant to comply with the requirements of that designation.

Recommendation

It is recommended –

a. that the existing designation of the airport land be reviewed and amended to include the unformed legal road and private land required for future airport expansion
b. that the airport flight paths and obstacle limitation surfaces be designated in a separate airspace designation
c. that air noise boundaries and airport noise controls be include in the forthcoming 10 year review of the Whakatane District Plan

4.4 STATUTORY REQUIREMENTS

Aerodrome certification

Section 139.5 of the Civil Aviation Act requires that an airport be certified under the Act when it services any aeroplane having a certified seating capacity of more than 30 passengers that is engaged in regular air transport operations. Regular air transport operations are defined as 700 or more movements by such an aeroplane within a consecutive 3 month period - which is equivalent to a regular service of 4 return flights per day.

In order to obtain certification the Airport Authority must produce –

1) An Exposition

   The Exposition is a comprehensive, detailed statement on how the Airport Authority proposes to comply with the requirements of Part 139 Civil Aviation Act. It is essentially the operating manual for the airport. It includes the internal quality assurance procedures required for monitoring the airport inspection programme and verifying that all safety and security procedures are being complied with

2) An Emergency Plan

   The emergency plan is also a comprehensive, detailed description of the procedures to be followed in the event of an emergency and provides for regular training exercises involving all emergency services

3) A Rescue Fire Plan

   The Rescue Fire document is another detailed description covering all aspects of response capability, response testing, duties and responsibilities, staffing levels, staff training, fitness testing, clothing requirements, vehicle and equipment requirements, consumable supplies, medical supplies etc.

4) An Air Traffic Control Agreement

   A copy of the letter of agreement with an Air Traffic Control Service provider

Security designation

Currently all airports (including domestic) which service scheduled passenger aircraft of 90 seats or more, are required to be security designated.

This requires the perimeter of the airport operational area to be security fenced to a height of 2.4 metres with a high grade chain mesh netting fence. It also requires that all passengers traveling on aircraft of 90 seats or more be security screened and kept isolated from non-screened passengers.

A security designated aerodrome is also required to have a Security Plan prepared by the Aviation Security Service and a Security Committee chaired by the Director of the Aviation Security Service or his delegate.

Non security-designated aerodromes must have an adequate facility available on the aerodrome (for use if directed by the Minister or Director of Civil Aviation) for security screening passengers and crew and keeping them separate from non-screened persons.

Rescue fire services

There are no specific requirements for non-certificated aerodromes to provide a Rescue Fire Service.

Where an aerodrome serves any aeroplane engaged in regular air transport operations, which has a certified seating capacity of more than 30 passengers, and where such aeroplanes account for 700 or more movements in the busiest consecutive three months of the year, the Airport Authority is required to provide a Rescue Fire Service which complies with the appropriate capacity for the largest aeroplane type regularly using the aerodrome as specified in the following table.

Aerodrome Category	Aeroplane overall length	Maximum fuselage width
1	0 metres up to but not including 9 metres	2 metres
2	9 metres up to but not including 12 metres	2 metres
3	12 metres up to but not including 18 metres	3 metres
4	18 metres up to but not including 24 metres	4 metres
5	24 metres up to but not including 28 metres	4 metres
6	28 metres up to but not including 39 metres	5 metres
7	39 metres up to but not including 49 metres	5 metres
8	49 metres up to but not including 61 metres	7 metres
9	61 metres up to but not including 76 metres	7 metres

Domestic Aerodromes

For domestic aerodromes the Rescue Fire category may be reduced as follows:

Non-turbojet Aircraft — Where an aerodrome serves only non-turbojet aircraft and is required to provide rescue fire services for aircraft of 30 seats or more it shall be Category 3

Turbojet Aircraft — Where an aerodrome serves any turbojet aeroplane with a certified seating capacity of more than 30 seats engaged in regular air transport operations, it shall be that category according to as provided in the above table reduced by two categories - but in any case shall not be less than category 4.

International Aerodrome

Each applicant for the grant of an aerodrome operating certificate for an international aerodrome must determine the rescue and fire fighting category of the aerodrome which, subject to paragraph (b), must be according to the largest aeroplane type regularly using the aerodrome as provided in the above table.

What this means

Currently Whakatane Airport is not required to provide a Rescue Fire Service as it does not service any aircraft of 30 seats or more engaged in regular air transport operations.

When such an aircraft commences operations the airport is not immediately required to provide a rescue fire service until the number of movements reaches 700 during the busiest consecutive three month period. This is equivalent to 4 return services daily.

When this level is reached a Category 3 service is required if the aircraft is a turboprop, or Category 4 if the aircraft is a jet.

Categories 1 to 5 inclusive require a minimum of one fire appliance only. The only difference being the amount of water and foaming agent to be carried and the rate of discharge required.

For example, a category 3 service requires a fire engine capable of carrying a minimum of 1200 litres water, 135 kilograms of foaming agent and having a discharge rate of not less than 900 litres per minute.

It is envisaged that the existing terminal complex will remain in use until it exceeds two simultaneous arrivals and departures of aircraft each carrying 50 passengers. The existing complex must therefore make provision for a Category 3 rescue fire station. A site has been identified for the construction of a rescue fire station with capacity for one fire appliance, a utility vehicle, medical trailer, watch-house, office, staffroom, shower/toilet/scrub-room and workshop.

Air traffic information service

In 1997 the Civil Aviation Authority (CAA) published a policy setting out the criteria for the provision of air traffic control at aerodromes. The document provides thresholds above which CAA will require various levels of air traffic services at certificated aerodromes.

The CAA is about to release new rules setting thresholds for the provision of air traffic control services at aerodromes, which will be based on the levels and types of aircraft movements.

CAA policy indicates that under the new rules the aerodrome operator will be responsible for ensuring the provision of air traffic control services in accordance with the established thresholds and that the approval specifications for the aerodrome will specify the arrangements for the provision of the required level of air traffic control services and its ongoing monitoring.

It states that aircraft operators will be prohibited from using aerodromes where air traffic services are required and are not being provided.

Where an aerodrome is not already certificated, it will be required to become certificated if movements reach the threshold level for the provision of an air traffic control service. All aerodromes with movements above a defined threshold will be required to maintain and supply aircraft movement data to the Director.

The current CAA policy requires that a certificated aerodrome shall provide an "aerodrome flight information service" where there is currently no aerodrome control service and there have been 40,000 or more aircraft movements per annum for three consecutive years; or there have been 7,500 or more IFR movements (i.e. instrument flight rules) per annum for three consecutive years.

Instrument Flight Rules (IFR)

Instrument flight rules (IFR) are a set of regulations and procedures for flying whereby navigation and obstacle clearance is maintained with reference to aircraft instruments only and separation from other aircraft is provided by Air Traffic Control. The primary benefit of these regulations allow an aircraft to safely fly through clouds, which is not permitted under VFR.

Visual Flight Rules (VFR)

Visual Flight Rules are where the pilot is ultimately responsible for navigation, obstacle clearance and traffic separation using the *see-and-avoid* concept.

The following table shows the total movements at Whakatane Airport for the year ended 31st December 2006, as provided by John Eades, who records landing information for the Whakatane District Council.

		Aircraft Movements (2006)*			
	Air Traffic Control Service	IFR	VFR	Total	
Whakatane	No	2,800	12,200	15,000	
Invercargill	Yes	6,100	17,500	23,600	
New Plymouth	Yes	11,000	21,200	32,200	
Dunedin	Yes	11,500	19,500	31,000	
Gisborne	No	11,800	12,100	23,900	
Rotorua	Yes	12,100	10,200	22,300	
Napier	Yes	15,400	7,900	23,300	
Palmerston North	Yes	21,300	36,900	58,200	

		Per Annum	Per Month	Per Week	Per Day
Beechcraft 190D	Beechcraft 190D	2,808	234	54	8
Twin-engined fixed wing	Metroliner; Chieftain	1,200	100	23	3
Single engined fixed wing	Various	7,500	625	144	21
Helicopter	Various	3,560	297	68	10
Total		15,068	1,256	290	41

Air Traffic control service

If an aerodrome is certificated, the Director of Civil Aviation may require that an air traffic control service be provided.

Currently there is no provision in the rules for the Director to require an air traffic control service to be provided at other than certificated aerodromes.

The plan has sought to determine at what stage air traffic control services will be required and to make provision for the required site location, infrastructure and utility services.

The current CAA policy requires that an "aerodrome control service" be provided where–

a) there are 100,000 or more aircraft movements per annum for three consecutive years; or

b) 60,000 or more aircraft movements for three consecutive years of which 9,000 or more are IFR movements; or

c) there are 15,000 or more IFR movements per annum for three consecutive years; or

d) there are scheduled IFR international passenger services.

A comparison with airports which have air traffic control services gives a clearer picture as to the level at which an ATC service is likely to be required, with the notable anomaly being Gisborne, which has more than the required threshold of 9,000 IFR movements and is comparable with Rotorua and Invercargill, both of which have an ATC Service.

It is most unlikely that Whakatane Airport will be required to provide an ATC service within the foreseeable future. Even five return services daily between Whakatane and Wellington would only increase the IFR count to 6400 movements per annum, with the threshold being 9,000 – and even then a service may not be required (e.g. Gisborne).

4.5 MANAGEMENT OF EXISTING INFRASTRUCTURE

This section covers an indefinite period during which the Airport will continue to maintain and where necessary add to or alter existing infrastructure until the 'trigger' is reached for the commencement of a major redevelopment programme which will over time, replace all of the existing infrastructure.

During this period it is important that the Airport Authority undertake as much of the investigation, research, planning and design work necessary to enable it to respond promptly to any proposal for which the business case justifies the immediate implementation of the proposed re-development programme.

Changes in the aviation industry can and do happen very quickly. A large number of variables can influence demand within very short periods of time. An airline decision to change its flight schedules, destinations, aircraft size etc. can happen within relatively short timeframes and create opportunities for airports which are 'ready' to respond.

From a marketing perspective it is essential that the Airport Authority know what can and can't be achieved and what its resources are when promoting the airport and the Eastern Bay of Plenty to prospective airport clients.

'Trigger' for commencement of re-development programme

The 'trigger' for commencement of the re-development programme is any proposal which involves significant capital expenditure on existing infrastructure.

Any expenditure on the runway, taxiways, aprons, terminal or car parks which is anything more than routine annual maintenance should require a business case –

a. to establish whether or not it is an appropriate time to initiate the planned re-development programme; and

b. to address whether such expenditure would compromise or prevent the immediate commencement of the planned re-development programme in response to a viable business opportunity or requirement as yet unknown;

A review of the financial case for commencement of the re-development programme should be undertaken at the time of each 5 yearly review of this Plan.

Land Acquisition

Land required for light aircraft hangars

It is believed that four hectares of land is a realistic area to meet the ongoing demand for light aircraft hangar development at the airport.

An initial two hectare area is required urgently to meet the immediate and expected demand for hangar sites.

A developer (who is also a commercial helicopter operator) has initiated a proposal to acquire the most suitable area for this purpose.

It is the land immediately to the west of the existing terminal complex as shown in the diagram on the right. It is believed that the landowner is reluctant to sell the land but has expressed an interest in the area being developed for such a purpose. It is understood that an application for resource consent is about to be lodged with the Whakatane District Council.

Receipt of the application will open the door for the Council to enter into discussions with the land owner with regard to designation of the four hectares for airport purposes and the purchase or long term lease of the land by the Airport Joint Venture owners.

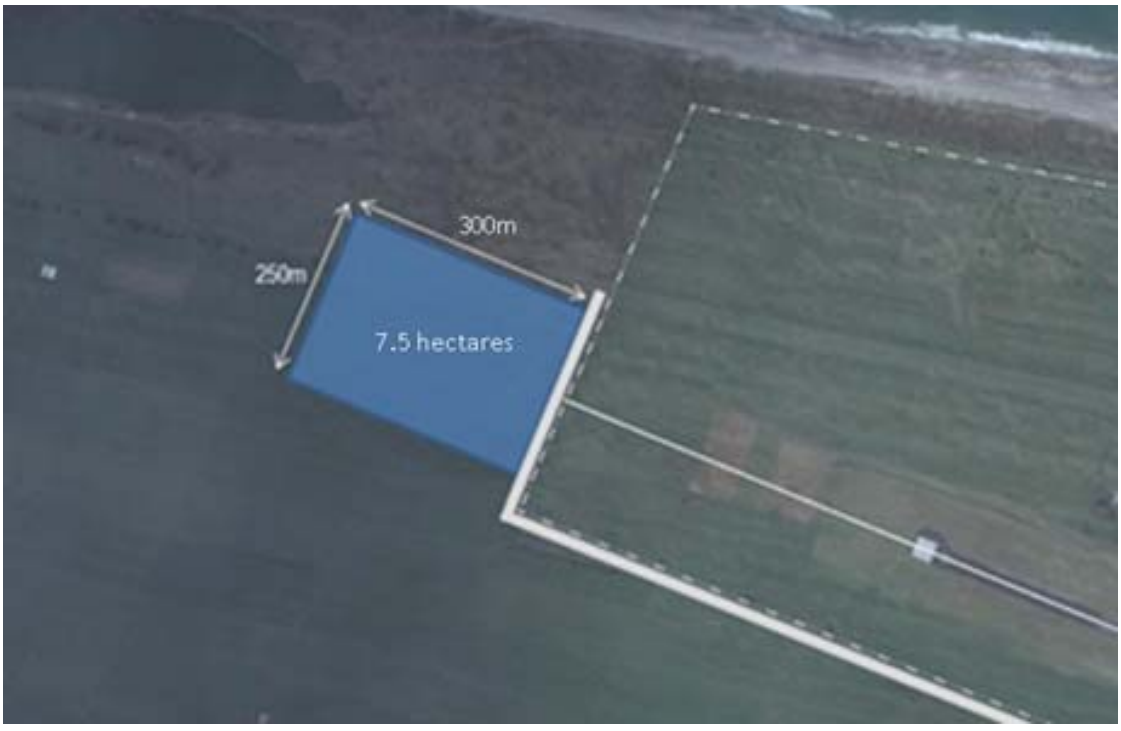
Land required for runway extension

It is recommended that a 300 x 250 metre area of land aligned with the extended centerline of the runway and situated immediately to the west of the unformed legal road boundary be designated for airport purposes. The diagram below shows the location of the area.

This designation of this area will significantly enhance the runway configuration and reduce the adverse effects that a runway extension located entirely within the airport boundary would cause.

It is important that discussions with the landowner take place prior to any discussion in public on this matter. It is preferable that agreement be reached with regard to the proposal and that designation not be a contentious issue.

It is envisaged that such an agreement would provide for the land to remain in private ownership until such time as the Airport Authority makes a formal decision to proceed with construction of the proposed runway extension, or until such time as the owner requires that the Airport Authority purchase the land, whichever is the sooner.



Terminal complex expansion

An additional area of not less than 3.5 hectares is required for the development of a new terminal complex on the existing site.

The area required is bordered by a white line (right) and includes both Crown-owned and private land.

The land would not be required until the 'trigger' is reached for commencing development.

It is recommended that the Council enter into discussions with the respective landowners for the purpose of reaching agreement that the areas be designated and identified in the District Plan for future airport purposes - but remain in current ownership until the land is required for airport development or the land owner requests that it be purchased by the Requiring Authority, whichever is the sooner. Again it is recommended that the discussions take place before any public discussion on the matter.

'Stopping' unformed legal road

A pre-requisite of extending the runway to the west of the airport boundary is 'stopping' a section of unformed legal road adjoining the western boundary and vesting the land in the Airport Authority for airport purposes.

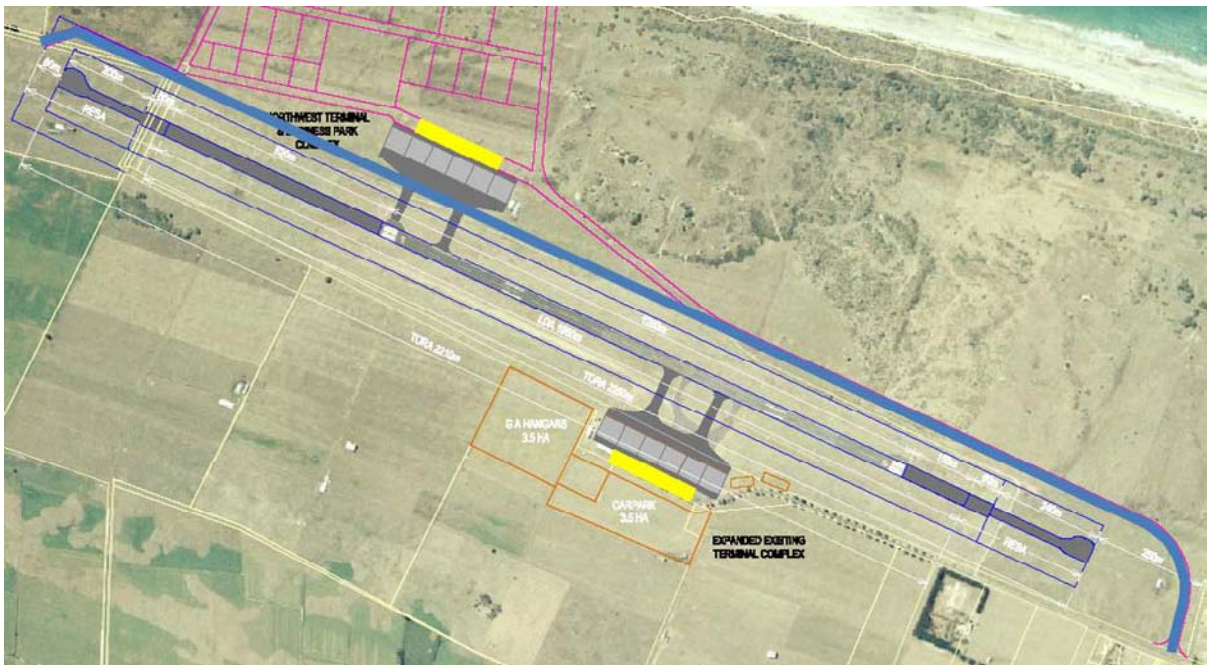
The road currently provides legal access to the following parcels of land –

a) Lot 1 DPS 9615 (SA5D/654) Rangitaiki Parish being a 19.6 hectare allotment owned by F.J.Foubister, M.Foubister, J.G.Foubister and M.T.K.Gray

b) Lot 2 DPS 9615 (SA5D/655) Rangitaiki Parish being a 17.3 hectare allotment owned by Grant Land Limited

c) Lot 1 DPS 9501 (SA5D/653) being a 10.8 hectare allotment owned by D.G.Martin, P.D.H.Martin, C.Martin and BBTLaw Trustees Limited

d) Part Allotment 274, Rangitaiki Parish being a 48.8 hectare Government Purposes Reserve



It will be necessary to provide access to these properties by establishing an unformed legal road from Aerodrome Road along the eastern boundary of the airport; then along the northern side of the runway strip and intersecting with the existing legal accessways to the above properties (marked blue on the above diagram).

A realignment of the road reserve will be required in the event of the north-west terminal and business park complex being developed.

The section of road reserve to be 'stopped' measures 250 metres in length by approximately 20 metres in width (i.e. an area of 0.5 hectares).

A second section of unformed legal road would also require to be stopped. This section measures approximately 200 metres in length by 20 metres in width and adjoins the area to be designated for light aircraft hangars.

It is envisaged that from a practical perspective the entire length of the unformed legal road would need to be 'stopped' from the point where it enters the airport property at the entrance to the existing terminal complex to a point on the western boundary where it no longer borders airport land.

Preferred site for development of new terminal complex

The site of the existing terminal is the preferred location for the development of the new terminal complex, subject to the 3.5 hectares of additional land required for roading, parking and an above-ground fuel storage compound being acquired.

It is the preferred location in that it is more efficient to re-develop the existing site than move to a new location which has the added cost of site preparation, roading and utility services.

Change to north-west site

The north-west terminal and business park complex would become the preferred site –

- in the event of the 3.5 hectares of additional land not being available for the redevelopment of the existing terminal complex, or
- when there is a known viable demand for the proposed business park development

The real advantage of the north-west site is the large area of land available for development of an airport-based business park. This is most likely to be the catalyst for the growth and development of the airport.

However, it is not yet known whether such a demand exists for a business park at Whakatane Airport – and until that is known the logical decision is to provide for the re-development of the main existing terminal site.

As any significant airport development is likely to be several decades away, the opportunity exists for the concept of an airport business park to be promoted and marketed to businesses and industries which may ultimately provide that demand.

In the event of a known demand the Joint Venture Partners would need to consider changing the location of the terminal complex to the north-western site as part of a business park development. Such a change can be made at any time up to the letting of a contract for the construction of a new passenger terminal, taxiway or apron on the existing terminal site.

Change to north-central site

The North-Central site is situated on the northern side of the airfield directly opposite the existing terminal complex.

This site is more constrained than the north-western complex and would require considerable earthworks to create a level platform for the terminal and car park development. The aprons and terminal building being at different levels would make construction more expensive.

This is the third preference after the existing terminal complex and the north-west terminal and business park complex and would only be selected where there were insurmountable problems with both of the previous preferences.

Utilisation of existing site if not required for re-development

In the event of the existing site not being used as the location for the new terminal complex it is proposed that the existing terminal complex (including aprons, taxiways, car park and related infrastructure) become a dedicated "Light Aircraft Facility" for aircraft with a maximum take-off weight of 5,700 kilograms or less.

The Plan's medium to long term objective is to utilise the existing terminal building, aprons and taxiways for commercial light aircraft operations, and to reserve Lots 1-5 for commercial aircraft hangars.

Internal zoning

It is recommended that a system of internal zoning be implemented to facilitate the planned and orderly utilisation and development of the airport in accordance with the objectives and strategies set down by the Joint Venture Partners.

Rules should establish the permitted activities within each zone. The zoning should be regularly reviewed to ensure that it remains relevant to the needs of the airport and its users, while ensuring that any changes are consistent with the objectives and strategies approved by the Airport Joint Venture Partners[14]

The following diagram and table indicates the type of zoning envisaged.

[14] i.e. W5hakatane District Council and Ministry of Transport5

Zones		Permitted Uses
A	Operational A Zone (i.e. security designated area)	Runways, taxiways, aprons (including lighting equipment)
		Navigation equipment (Zone G refers)
		Control tower, rescue fire station, backup electricity generation)
		Aircraft parking
		Haymaking
B	Operational B Zone	Cattle grazing
		Helicopter low flying
		Weather stations
		Navigation equipment
C	Buildings Zone	Passenger terminal
		Rescue Fire Station
		Control Tower
		Electricity backup generator
D	Road and Car Parking Zone	Public car park
		Internal roads
		Taxi stands
		Rental car parks
		Coach parks
		Service vehicle parks
E	Aircraft Hangar Zone	Commercial fixed-wing and helicopter hangars
		General aviation fixed-wing and helicopter hangars
		Temporary accommodation (within hangars)
		Offices and waiting rooms for aviation-related businesses (within hangars)
		Pilot training facilities (e.g. lecture rooms)
		Car parking (non commercial)
F	Business Park Zone	Visitor accommodation (hotels, motels)
		Conference and meeting facilities
		Events centre
		Restaurants
		Visitor retail goods and services
		Office accommodation
		Airport services (e.g. catering)
		Air freight distribution
		Aircraft maintenance facilities (Airside Road)
		Light industrial uses (low environmental impacts)
G	Navigation & Aviation Information Equipment Zone	VOR Radar (VHF Omnidirectional Range)
		Distant measuring equipment (DME)
		Airport beacon
		Approach lights
		Visual approach slope indicators (VASI, PAPI)
		T-bar approach lights
		Meteorological weather monitoring equipment
		Communications equipment
H	Fuel Storage Zone	Main above-ground fuel storage compound
		Subsidiary above ground storage compound/s
		Underground tanks with above ground dispensing system

Development of light aircraft hangar complex

Several airports have established a quality standard for light aircraft hangar development which have been successful in growing the light commercial and general aviation activity at those airports. Indications are that a similar development at Whakatane Airport would encourage operators to consider the attractions of relocating their business and/or aircraft to Whakatane.

As stated previously, an application for resource consent is about to be submitted to the Council seeking approval to construct up to 22 light aircraft hangars on a 2 hectare area immediately adjoining the existing hangar complex. The design is modelled on the existing development at Tauranga Airport and comprises two rows each consisting of 11 attached hangars. The configuration optimises the utilisation of the area and establishes a quality design standard which should create an aesthetically attractive and professional appearance.

The key issue is to resolve the issue of ownership and control of the land where the development is to be situated.

If the land is to remain in private ownership the landowner must obtain the approval of the Airport Authority in order to gain access to the aerodrome operational area. Such an agreement is likely to include, but not be limited to the following provisions –

1) vesting of the land in the Airport Authority for control and management purposes pursuant to the Airport Authorities Act 1966;
2) that the joint venture develop the land at its own cost in all respects in accordance with a development plan, specifications, timeline, terms and conditions approved by the Airport Authority;
3) that the Airport Authority and/or the Whakatane District Council have the right to protect the land for airport purposes by plan change and/or designation pursuant to the Resource Management Act 1991;
4) that the landowner not be permitted to subdivide the land into separate freehold titles pursuant to the Land Transfer Act 1952, but may subdivide the land into unregistered leasehold sections;
5) that the landowner have the right to lease or sell improvements situated on leasehold sections subject to the provisions of the Airport Authorities Act 1966;
6) that in the event of the land being designated for Airport purposes, the landowner waives it's right to require the Airport Authority to purchase the land pursuant to section 185 Resource Management Act 1991
7) that the landowner shall remain responsible for the payment of local authority rates, utility charges and maintenance of improvements on non-leased areas
8) that the Airport Authority shall process and determine all applications to lease land within the area under it's control subject to prior consultation with the landowner and subject to the prior financial approval of the Lessor where such approval shall not be unreasonably withheld;
9) that the landowner shall have sole discretion as to whether any physical improvements on the said land are offered for sale to the lessee;
10) that the Airport Authority shall have authority pursuant to section 5 Airport Authorities Act 1966 to acquire part or all of the land or improvements;
11) that leasehold rentals shall be set by the Lessor in accordance with the rental policy set from time to time by the Airport Authority;

12) that the landowner and tenants shall pay airport landing charges as set from time to time by the Airport Authority on all land under the management and control of the Airport Authority and, the land owner shall not allow aircraft to land on property outside the airport operational area;

13) that on expiry or earlier termination of leases on the said land the ownership of improvements shall vest in the landowner at no cost to the landowner;

14) that the landowner be responsible for invoicing and collecting all payments related to land leases and the sale of improvements;

15) that the landowner shall pay to the Airport Authority an annual administration fee (to be determined) based on a percentage of the annual leasehold rental charged on the said land, payable in advance;

16) that the landowner shall meet the full cost of any security requirements determined from time to time by the Civil Aviation Authority and/or Aviation Security Service;

17) that the landowner meet the proportionate direct cost of Airport insurances as determined from time to time by the Airport Authority and it's insurance providers;

18) that the landowner and it's tenants comply at all times with all statutory requirements of operating within an airport environment including but not limited to Airport Authorities Act 1966, Civil Aviation Act 1990, Resource Management Act 1991, Health and Safety In Employment Act 1992 and the Local Government Act 2002.

It is suggested that the Airport Authority consult with the land owner and the prospective developer in an endeavour to reach agreement as to the best option to progress the proposal.

Options such as purchasing or a long-term lease of the land from the current landowner would obviously be discussed, with the latter being consistent with both the owners apparent wishes and the underlying tenure by which the Whakatane District Council holds the aerodrome land.

It is envisaged that the Airport Authority would then issue the developer with a Licence to Occupy part of that land for a sufficient period to permit the construction and sale of hangars. The Authority would then issue a long-term lease to the purchaser of each hangar.

It is suggested that each lease be restricted to the footprint of the structure so that the Authority has control over all other areas in terms of maintenance and tidiness.

Terminal extensions

The existing terminal building has an existing ground floor area of 249m^2. There is provision for only one airline check-in facility which is leased to Eagle Airways Limited, a wholly-owned Air New Zealand subsidiary. The lease expires on 31st July 2012.

The check-in facility includes two check-in counters with baggage conveyor to the baggage make-up area and loading bay plus two offices. Arriving passengers collect their baggage at the kerb-side outside the terminal.

The ability to service more than one airline could be achieved by arrangement with Air New Zealand and this should be addressed at the time the lease is due for renewal, or sooner. While it is not uncommon for airlines to provide check-in services to other airlines, they may refuse to do so.

An alternative could be for a contractor to lease the check-in facilities and provide services to more than one airline from the same facility. As the current site is limited to the simultaneous operation of two aircraft, the current check-in facilities should be adequate on a shared-use basis.

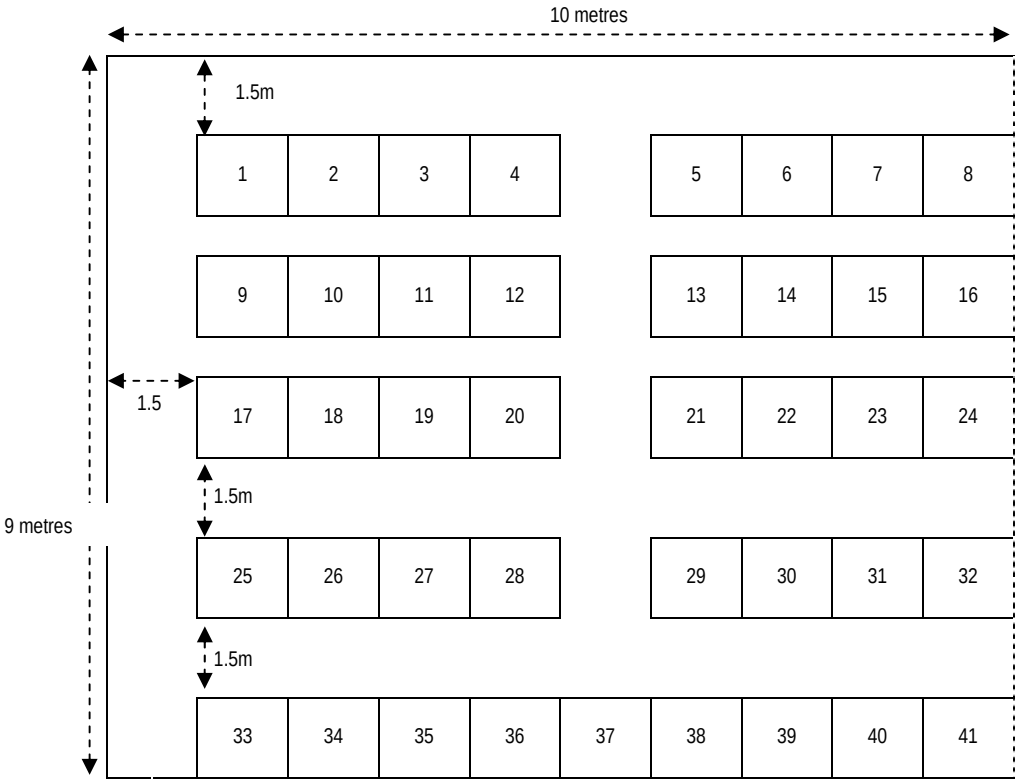
Scheduled turboprop services will continue to operate through the existing terminal for the foreseeable future. With only two aprons available the airport is limited to two same-time scheduled arrivals and departures.

Expansion of the current terminal building to cater for larger aircraft is limited by its low ceiling height and rather complex and cluttered design features. Given that at some time in the future it will be replaced by a new terminal complex, the question is what can be done to cost-effectively increase the capacity of the existing terminal to meet the demand until that time arrives.

The addition of a relocatable 20m x 20m building would increase the ground-floor area of the terminal to 650m^2, an increase of 260%.

The addition would provide sufficient area to cater for the simultaneous arrival and departure of two 50 seat aircraft, provided that the baggage claim remains at the kerb-side outside the terminal building. The following diagram illustrates the proposed extension.

The following diagram illustrates the space requirements for a departure gate lounge. It shows that a module of 10 x 9 metres will seat 41 adults, which is equivalent to an average load factor of 81% for a 50 seat aircraft. An average load factor is more likely to be about 75%.



Provision for Security Screening

Certificated aerodromes which are NOT security designated are required to have a contingency plan in place to provide areas for the screening of domestic and/or international passengers and crew and their baggage when required to do so by the Minister or Director of Civil Aviation.

The proposed addition will provide adequate area to fulfill this requirement in the event of the threshold for domestic screening being reduced to include aircraft with a seating capacity of less than 90 persons.

Runway, taxiways and aprons

The current 1280 metre runway, taxiways and aprons are adequate to meet the unrestricted take-off and landing requirements of Air New Zealand's current fleet of turboprop aircraft, which includes 19-seat Beechcraft 190D, 50-seat de Havilland Dash 8 300Q and 68-seat Aerospatiale ATR 72-500 aircraft.

Air New Zealand occasionally use Air National to provide backup services using 19 seat BAe Jetstream aircraft, which require a takeoff distance for unrestricted operation of 1400 metres and is weight-limited on Whakatane's 1280 metre runway.

Air New Zealand provides scheduled services to 14 regional centres which have runways ranging in length from 1097 to 1425 metres, an average length of 1308 metres. Therefore it is unlikely that it will purchase aircraft which require these regional airports to extend their runways, as this would justify increases in landing charges which Air New Zealand strives to keep under control.

Grass runway

The Reference Code 1A grass runway is expected to be adequate to meet the current and future needs of both resident and visiting light fixed wing aircraft. Most of these aircraft are also capable of using the sealed runway.

The limitation of the grass runway is that it does not have the required separation from the main runway to permit simultaneous operation of both runways.

Public car park

The following assumptions have been used to estimate the total number of parks required at the existing terminal until it is replaced by a new terminal complex on the same site.

Capacity of existing terminal complex	
Number of outbound services per day	10
Number of seats per service	50
Total number of outbound seats per day	500
Average load factor	75%
Total outbound passengers per day	375
% passengers who are children	25%
Total children per day	94
Number of adult passengers per day	281
% adult passengers who park vehicle at airport	60%
Total vehicles per day	169
Vehicle average length of stay in car park (days)	1.5
Total number of car parks required	253
Average m^2 area required per park (including access roads)	25
Total area required (m^2)	6,328

Area available for parking	Dimensions (metres)		m2
Area 'A'	225	25	5625
Area 'B'	50	25	1250
Area 'C'	50	25	1250
Total area available			8125
Total parking spaces available			325
Total parking spaces required			253
Buffer spaces available			72
% buffer			28.4%

250 car parking spaces compare with 200 at Tauranga Airport and 350 at Napier, Dunedin and Invercargill and are considered to be more than adequate to meet the likely demand.

Commercial helicopter hangars

The provision of both scheduled and charter air transport operations using light fixed-wing and rotary-wing aircraft is an important facet of the services currently available at Whakatane Airport. Operators have emphasised the need to keep commercial passenger services separate from general aviation and to separate fixed- and rotary-wing aircraft operations.

Consultation with airport users suggest that commercial passenger transport operations should be separated from general aviation activity. This has proved difficult to achieve as there is extremely limited area available for the location of commercial aircraft hangars on the southern side of the airport, with most of the suitable land being subject to existing leases.

The area immediately to the east of that requested by the commercial helicopter operators has been investigated. A desktop survey using AutoCad has provided the measurements required for the calculations in the following table:-

Description	Deductions (metres)	Distances (metres)	Height Limits (metres)
Distance from runway centreline to road boundary		143.73	
Less distance from runway centreline to airstrip perimeter	75.00		
Distance from runway strip boundary to road boundary		68.73	
Less building line distance from road boundary	0.00		
Less building length (north/south)	25.00		
Net distance from runway strip boundary to front of building		43.73	6.25
Net distance from runway strip boundary to rear of building		68.73	9.82

As the proposed building site is situated more than 9 metres from the legal road boundary the calculation is shown as zero.

The table shows that it is <u>not</u> possible to build hangars of the proposed size and height. However, if the hangars are rotated to an east/west orientation, the transitional side slope height limits can be achieved as shown in the following table.

Description	Deductions (metres)	Distances (metres)	Height limits (metres)
Distance from runway centreline to road boundary		143.73	
Less distance from runway centreline to airstrip perimeter	75.00		
Distance from runway strip boundary to road boundary		68.73	
Less building line distance from road boundary	0.00		
Less building width (north/south)	20.00		
Net distance from runway strip boundary to front of building		48.73	6.96
Net distance from runway strip boundary to centre ridgeline of roof		58.73	8.39
Net distance from runway strip boundary to rear of building		68.73	9.82

Important Note: to achieve the above requrements the building platforms must be at the same or lower RL as the airstrip boundary.

This information has been made available to the operators to allow them to reconsider their requirements and decide whether their buildings are able to be realigned in order to meet the limitations of the site.

The following diagram shows the proposed hangar location (in blue), the measurements used in the above calculations and the cut and fill requirements to level the site to that of the airfield.

Rescue Fire station

The airport will require a rescue fire service within three months of having a regular air transport service provided by an aircraft with 30 seats or more, where the number of movements by that aircraft will exceed 700 in a consecutive three month period. This is equivalent to an average of four return services per day over a 90 day period. (Note: a landing plus departure equals two movements)

The service would require –

a. a fire engine with a minimum water carrying capacity of 1200 litres, 135 kilograms of foaming agent and capable of a foam discharge rate of not less than 900 litres per minute
b. a medical trailer complete with medical supplies
c. a light utility vehicle
d. trained staff sufficient for one to be present immediately prior to, during and after the landing and departure of any regular air passenger transport aircraft of 30 seats or more
e. the minimum required supply of foaming agent

A fire station of approximately 16 x 14 metres in size would be required to house the motor vehicles, medical trailer and supplies, plus a control office, staff room, toilet, shower and scrub room, workshop and dry powder storage. A hose drying gantry would also be required. A site for the station has been identified and zoned for the purpose.

Emergency water storage

Within 3 minutes of an alarm the airport fire appliance must reach the aircraft at any point within the airport movement area and be discharging foam at a rate not less than 50% of the required discharge rate, which is 900 litres per minute for a category 3 service.

This means that the appliance is likely to empty its tanks within 2 minutes of reaching the aircraft, and may need to refill its water tank and return to the fire at least once before back-up appliances arrive from Whakatane.

It is recommended that a pressure test of the airport water supply be undertaken to ensure that the replenishment rate meets the minimum requirements and where the pressure and/or supply is insufficient to meet those requirements an emergency water storage and pressurised filling system be installed.

Aviation fuel storage

The current fuel storage facilities appear to be adequate for the existing requirements. It is recommended that the Airport Authority require the oil companies (Shell and BP) to provide it with copies of all monitoring reports on the condition of its underground storage tanks including any evidence of leaks or seepage into the surrounding soil and ground water systems which have occurred or are still occurring.

Helicopter circuit training and low flying area

Helicopter low flying and circuit training is one of the more intrusive sources of noise nuisance for persons living, working or spending their recreation or leisure-time close to an airport. The existing circuit which provides for all aircraft is immediately to the south of the airport.

The opportunity exists for an approximate 60 hectare area of the airport immediately to the north-east of the runway strip to be allocated for this purpose. It is therefore recommended that a report be obtained from Astral Aviation Consultants on the issues relating to allocating this area for this purpose.

Any change would need to be subject to consultation with the lessees of the grazing blocks which occupy that area. Limitations would need to be placed on low-flying over paddocks where livestock are grazing.

Pilot training facilities

There is currently a world-wide shortage of commercial pilots. Smaller airlines are complaining that they are training pilots only to lose them within a short space of time to first officer positions with large international airlines as soon as they reach the required number of flying hours.

This creates a significant opportunity for the airport to attract pilot training organisations to establish or move an existing school to Whakatane. The development of the proposed new light aircraft hangar complex will provide the momentum for such facilities.

4.6 MAJOR DEVELOPMENT PROGRAMME

The development programme described in this section is based on the assumption that the preferred option will be confirmed.

That option includes a 1950 metre runway, the re-development of the existing terminal complex and the development of a light aircraft hangar park alongside the existing terminal complex.

A scheme plan to develop the north-western site as a combined terminal and business park complex should be used as a marketing tool to determine whether there is sufficient interest in the business park proposal to justify the relocation of the new terminal complex to the north-western site.

Airport business park

The north-western site would appear to have very good potential for the development of an airport business park.

In the event of a significant demand for such a park being known prior to the re-development of the existing terminal complex, a business case assessment of the viability of developing the new terminal complex on the north-western site should be undertaken.

This would determine whether the potential investment returns are sufficient to justify the added cost of developing the new terminal complex on that site.

As a marketing strategy, the availability of a concept plan and artists impression of the combined terminal and business park complex on the north-western site[15], is likely to generate considerable interest which may in turn attract the necessary cornerstone industries to underwrite the investment. Such interest may come from an airline seeking a base for its operations, a major resort hotel and conference complex, a warehousing operation which relies on air transport or an export industry which requires direct air access to the Australian market. It is vital to keep these issues under regular review.

Relocation of weather station

The NZ Meteorological Services weather station, which is located immediately to the east of the existing terminal building, will need to be relocated to a suitable site elsewhere on the airport prior to the commencement of the re-development programme. The reasonable cost of relocation would need to be met by the Airport Authority.

Security fencing

Security designated aerodromes are required to have the entire perimeter of the operational area security fenced with a chain link mesh netting fence with an outrigger at the top facing outwards into the non-designated area. All security fencing must comply with the specifications set down from time to time by the Director of Aviation Security. All gates are required to be of the same specification as the security fence and must have good quality locking and access control devices.

Access through buildings such as passenger terminals, aircraft hangars and fire stations and the like must have locked security-controlled doors which can only be accessed by persons holding an appropriate level Aviation Security Card, or by persons under the care and supervision of a person holding the appropriate security clearance and training.

Electronic surveillance and monitoring of security cards of all authorised persons accessing security designated areas is now becoming the norm.

[15] Subject to the 1950 metre runway preference having been confirmed – otherwise the concept plan should be for the north-central site.

Landscape planning and development

A landscape plan and artists impression to enhance the environment of the new terminal complex should be prepared well in advance of the project commencing, so that shrubs and low growing trees can be secured and grown to the required size ready for planting on completion of each stage of the programme.

New terminal development

The location of the new terminal building is immediately behind the existing terminal at a distance of not less than 226 metres from the runway centreline.

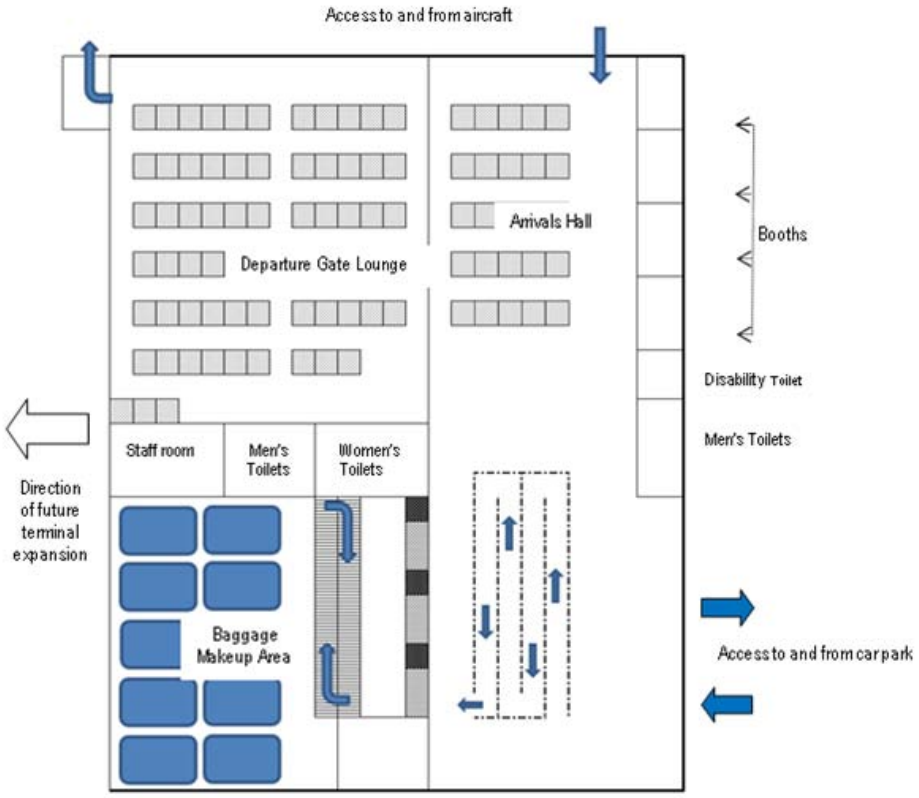
The minimum practical size for the first stage of the new terminal would be 750m^2 (i.e. 25 x 30 metres) – being the area required for two simultaneous 50 seat aircraft arrivals and departures.

750m^2 would not be sufficient for an indoor baggage claim area which would continue to be at the kerb side. The minimum terminal size inclusive of an indoor baggage claim area with a single baggage carousel would be 1200m^2 (i.e. 40 x 30 metres).

A single span design is recommended in order to maximise flexibility to change the layout of internal space as the terminal is progressively extended to cater for the growth in passenger numbers. The eventual size of the building footprint is expected to be 6,000m^2 (i.e. 200 x 30 metres) with provision for a first floor area of an equivalent size.

A tilt-slab concrete exterior construction is recommended for it's superior fire resistance and thermal qualities. A minimum parapet height of 6 metres would allow a non-reflective roof to be hidden from view and would allow verandas to be located above the maximum height for coaches and heavy vehicles. The use of verandas and decorative finishes can be used to enhance the appearance of the building.

The following diagram of a possible layout for the first stage terminal development is indicative only.



Runway upgrade and extension

The runway upgrade includes strengthening and re-surfacing the existing 1280 metre runway to cater for larger aircraft which require a runway strength of up to PCN50.

Extensions to the east and west of the existing runway will provide the added length necessary to meet the operational performance requirements of the 737 800 design aircraft.

1950 metre runway

The recommended option is a 1950 metre runway with a 256 metre starter extension at the western end of runway 09 and a 300 metre starter extension at the eastern end of runway 27, providing a take-off run of 2206 metres on runway 09 and 2250 metres on runway 27. A landing distance of 1950 metres is available in both directions.

These distances meet the unrestricted operating requirements of the 737 800 design aircraft for non-stop distances of up to 2800 kilometres. The positioning of the runway also achieves a 10 metre obstacle height limit at the golf club boundary, only 0.6 metres less than the existing height.

The construction of the runway requires strengthening and resurfacing the 1280 metre existing runway runway to meet the PCN50 runway strength required by the design aircraft.

The following table summarises the declared operating lengths for this runway option.

Declared operational lengths for proposed extended runway (1950 metres)		
	Runway 09	**Runway 27**
Takeoff run available (TORA)	2210m	2250m
Accelerate-stop distance available (ASDA)	2210m	2250m
Takeoff distance available (ASDA)	2270m	2310m
Landing distance available (LDA)	1950m	1950m

Extension to these declared lengths would provide a runway of similar length to that proposed at Rotorua, and currently existing at Palmerston North and Wellington. It would be approximately 200m longer than the runway at Queenstown airport.

This runway option can only proceed if the following land can be acquired –

1. the closure and acquisition of a 250 metre long section of unformed legal road adjoining the airports western boundary; and

2. 7.5 hectares of privately-owned land, measuring 300 metres in length and 250 metres in width situated along the extended centreline of the runway immediately to the west of the unformed legal road which adjoins the airports western boundary.

In the event of either one of the above conditions not being able to be met the following option will need to be pursued.

1870 metre runway

This option provides a runway length of 1876 metres supplemented by a starter extension of 260 metres at the eastern end and 240 metres at the western end, providing a take-off run (TORA) of 2126 metres on runway 27 and 2116 on runway 09. The landing distance would be 1876 metres in both directions. This is 30 metres less than the braking distance required by the design aircraft for unrestricted arrivals on a wet runway.

The take-off distances are sufficient to meet the unrestricted take-off requirements of the 737 800 design aircraft for non-stop flights to Sydney, but would impose an estimated 10% load factor reduction for non-stop flights to Melbourne.

The major limitation of this option is the height of the obstacle limitation surface (OLS) at the boundary between the Airport and Whakatane Golf Club properties. The current height is based on the distance between the inner edge of the existing runway strip and the Golf Club boundary, a distance of 660 metres at a gradient of 1.6% - which is 1 metre height gain for every 62.5 metres in distance = 10.26 metres OLS at the Golf Club boundary.

The following table summarises the declared operating lengths for this runway option.

Declared operational lengths for proposed extended runway (1876 metres)		
	Runway 09	**Runway 27**
Takeoff run available (TORA)	2116m	2126m
Accelerate-stop distance available (ASDA)	2116m	2126m
Takeoff distance available (ASDA)	2176m	2186m
Landing distance available (LDA)	1876m	1876m

These distances are subject to survey confirmation of the flight paths, but Astral has a high level of confidence that they will be achievable.

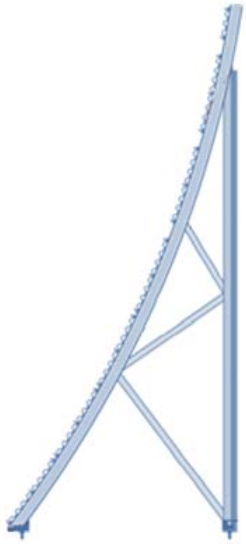
Jet-blast protection

The starter extensions on the 1876 metre runway have been increased to virtually the full length of the runway end safety areas (RESA) which requires that jet blast protection be provided in the absence of sufficient distance between the aircraft and the airfield boundary.

Jet blast protection can be achieved by building an earth embankment (as at Queenstown Airport) or a fabricated steel deflector shield or fence as at Wellington Airport.

The diagram on the right and the photograph below are examples of the type of proprietary structures that are available to protect persons and property from the blast created by jet aircraft engines.

This particular design is said to be available in heights ranging from 91cm to 10.6 metres. The surface is constructed of high-section modulus galvanised steel sheets which are bolted to the structural supports to provide a strong, corrosion-resistant surface designed to withstand high temperatures and vibration.



It is available with concave, vertical or combination surfaces depending on the application.

The structure is built of pre-fabricated, heavy duty galvanised steel structural components and is designed to withstand engine thrusts of up to 115,000 lbs and 675 km/hr.

The afterburner deflectors can withstand surface temperatures of up to 399^{o}C.

New taxiways

Two new high strength taxiways will be required to cater for aircraft which are able to operate within a pavement strength limit of PCN50.

New high strength aprons

Provision has been made for a total of six 50 x 50 metre aprons with a static load capacity of 80 tonnes. The aprons would be fitted with recessed power outlets for starting aircraft which do not have auxiliary power units (APUs).

The new aprons will be set back 166 metres from the existing runway centreline to provide for a maximum aircraft tail height of 13 metres for 'nose-in push-out' parking. Construction of the aprons will require the removal of the existing terminal building.

Provision will need to be made for runoff from the aprons to be channelled through collectors and scrubbers where any fuel or chemicals spilled on the aprons can be safely removed and disposed of.

Apron and taxiway design and preliminary costings should be undertaken –

a. When confirmation is received that the additional land required to develop the preferred site is available for acquisition at the appropriate time; and

b. the recommended geo-technical testing of sub-grade materials has been completed

Navigation aids

With recent advances in the accuracy and reliability of aircraft on-board satellite navigation systems the requirements for ground based radar, distance measuring equipment, visual approach systems and the like are also changing and the requirements that will apply several decades into the future are likely to be very different to what they are today. The recent changes in required navigation performance (RNP) has made very significant improvements in the pilot's ability to accurately position the aircraft. This has major advantages in places such as Queenstown which are surrounded by high terrain and clearly has benefits in situations such as the eastern approach path over Kohi Point ridge.

Provision has not been made in this plan for the location of a VOR system as Astral Consultants believe that advances in navigation technology are moving so quickly that such equipment is unlikely to be required by the time the runway is extended.

New roading and parking development

Roads

As traffic volumes increase provision will eventually need to be made for widening and upgrading the access road to and from the airport. All internal roading and parking areas in the vicinity of the existing terminal complex will be replaced as part of the re-development programme.

Public car park

A provisional area of 2.5 hectares has been identified for car park development. This area is based on 25m^2 per vehicle which includes the area required for all circulation roads, footpaths and landscaping throughout the parking area.

Parking is at right-angles to the curb and measure 5.5 x 2.5 metres with a 5 metre-wide road width for ease of access and safety. Dedicated areas within the public car park are allocated to rental car companies.

2.5 hectares will provide sufficient area for 700 vehicle parks. This compares with the following car parking capacities at other regional airports –

Airport	Approximate number of parking spaces
Rotorua	400
Tauranga	200
Napier	370
Palmerston North	650
Dunedin	350
Invercargill	350

Based on the above capacities a realistic range would appear to be provision for 350 to 750 vehicles. It should be noted that the current activity at Palmerston North Airport is similar to the design capacity for Whakatane Airport (i.e. 50,000 aircraft movements per year). It is therefore suggested that a car park capacity of 700 vehicles should be adequate to meet any future demand at Whakatane Airport.

Car Parking System

Airports such as Tauranga, Napier, Hamilton, Palmerston North and Rotorua have installed automatic parking systems in recent years as a means of cost-effectively collecting parking revenue.

It is envisaged that Whakatane Airport will likewise install an automated system during the redevelopment phase, if not sooner. The system can also be used to charge taxis and other hire vehicles a ‘pick-up’ charge.

Fuel storage compound

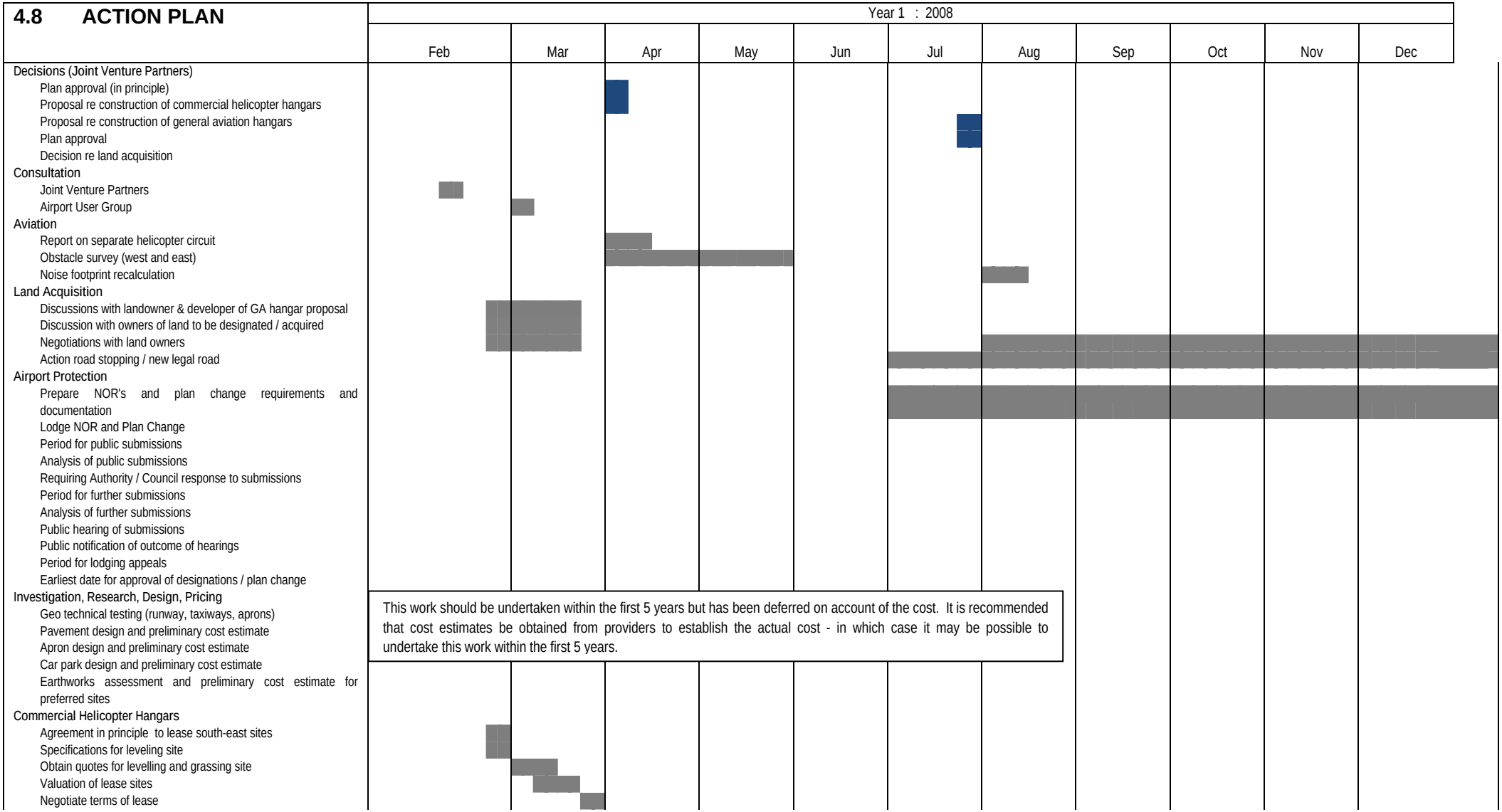
The volume of aircraft activity required to activate the proposed re-development programme will be sufficient to justify the installation of several 50,000 litre above-ground Jet A1 tanks within a 'bunded' compound, with a mini-tanker being used for aircraft refuelling. This type of storage system is more environmentally friendly than underground tanks, where leakages are difficult to detect and have been known to cause serious soil and ground-water contamination.

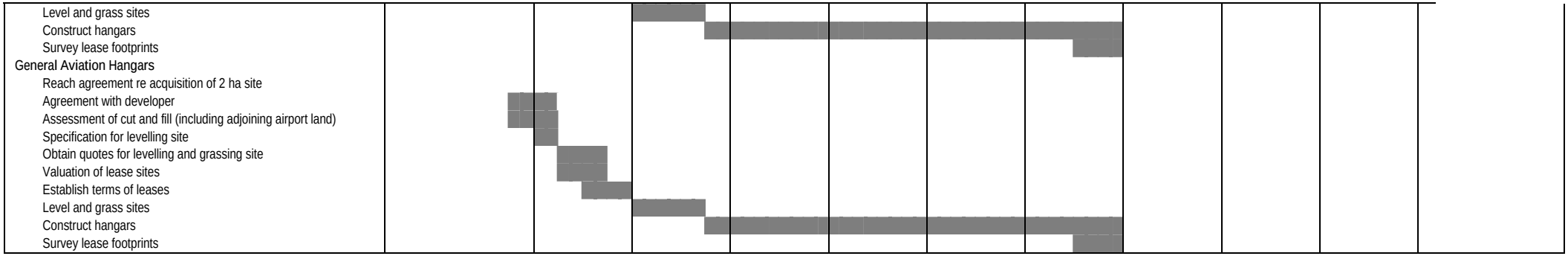
4.7 INDICATIVE DEVELOPMENT COSTS

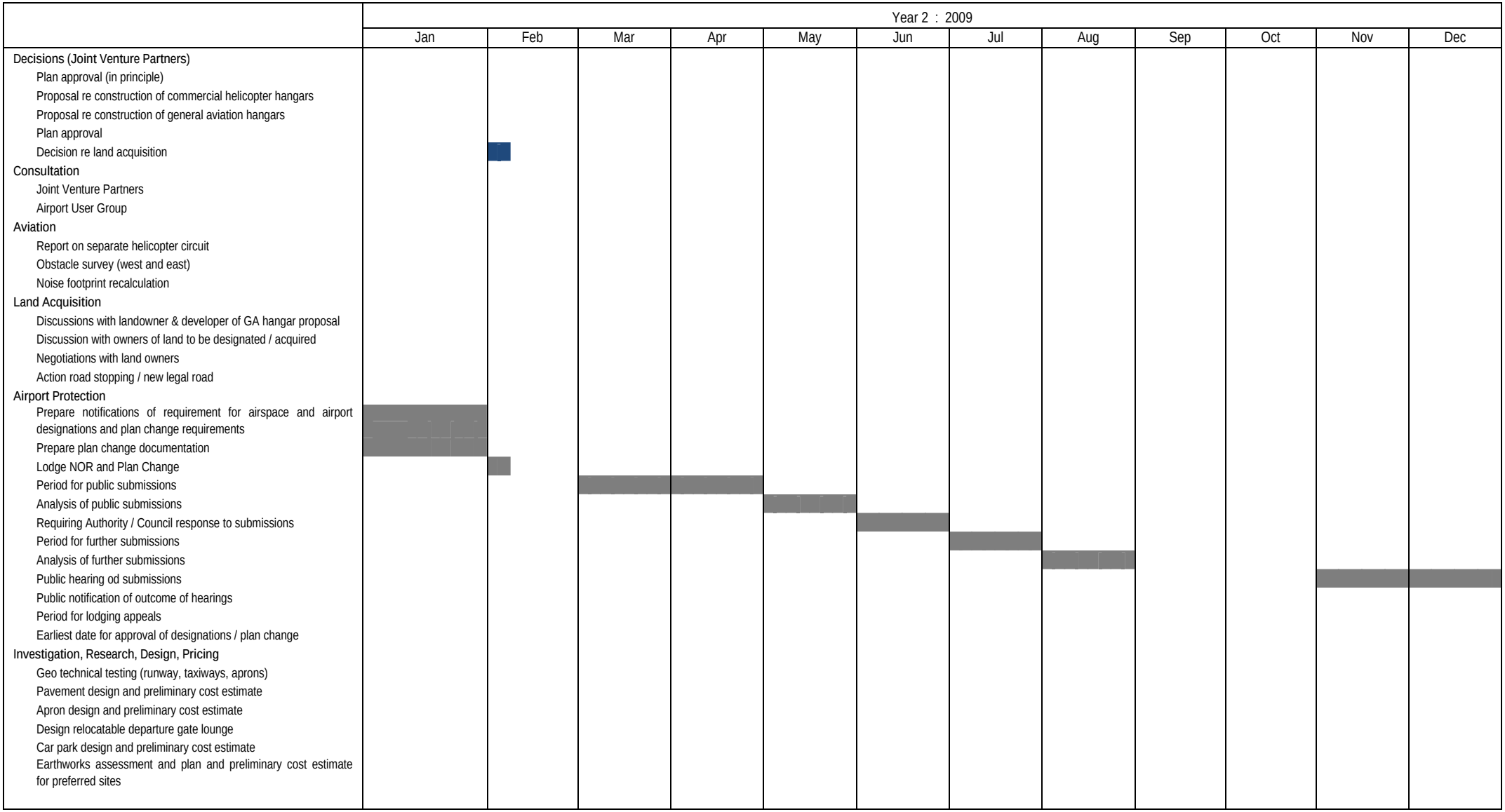
It is recommended that a detailed schedule of development costs be prepared as a basis for future decision-making. The reliability of such a schedule is dependent on the quality and reliability of the design, quantity and pricing information which is available to the person preparing the estimate.

At this early stage of the planning process there is very little information available on which to base any form of estimate. This will only be remedied by undertaking the investigation, research and design which will provide the level of detail required to prepare such a schedule.

4.8 ACTION PLAN




Level and grass sites
Construct hangars
Survey lease footprints
General Aviation Hangars
Reach agreement re acquisition of 2 ha site
Agreement with developer
Assessment of cut and fill (including adjoining airport land)
Specification for levelling site
Obtain quotes for levelling and grassing site
Valuation of lease sites
Establish terms of leases
Level and grass sites
Construct hangars
Survey lease footprints


Year 2 : 2009
Jan
Feb
Mar
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May
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Sep
Oct
Nov
Dec
Decisions (Joint Venture Partners)
Plan approval (in principle)
Proposal re construction of commercial helicopter hangars
Proposal re construction of general aviation hangars
Plan approval
Decision re land acquisition
Consultation
Joint Venture Partners
Airport User Group
Aviation
Report on separate helicopter circuit
Obstacle survey (west and east)
Noise footprint recalculation
Land Acquisition
Discussions with landowner & developer of GA hangar proposal
Discussion with owners of land to be designated / acquired
Negotiations with land owners
Action road stopping / new legal road
Airport Protection
Prepare notifications of requirement for airspace and airport designations and plan change requirements
Prepare plan change documentation
Lodge NOR and Plan Change
Period for public submissions
Analysis of public submissions
Requiring Authority / Council response to submissions
Period for further submissions
Analysis of further submissions
Public hearing od submissions
Public notification of outcome of hearings
Period for lodging appeals
Earliest date for approval of designations / plan change
Investigation, Research, Design, Pricing
Geo technical testing (runway, taxiways, aprons)
Pavement design and preliminary cost estimate
Apron design and preliminary cost estimate
Design relocatable departure gate lounge
Car park design and preliminary cost estimate
Earthworks assessment and plan and preliminary cost estimate for preferred sites

	Year 3 : 2010											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Decisions (Joint Venture Partners)												
Plan approval (in principle)												
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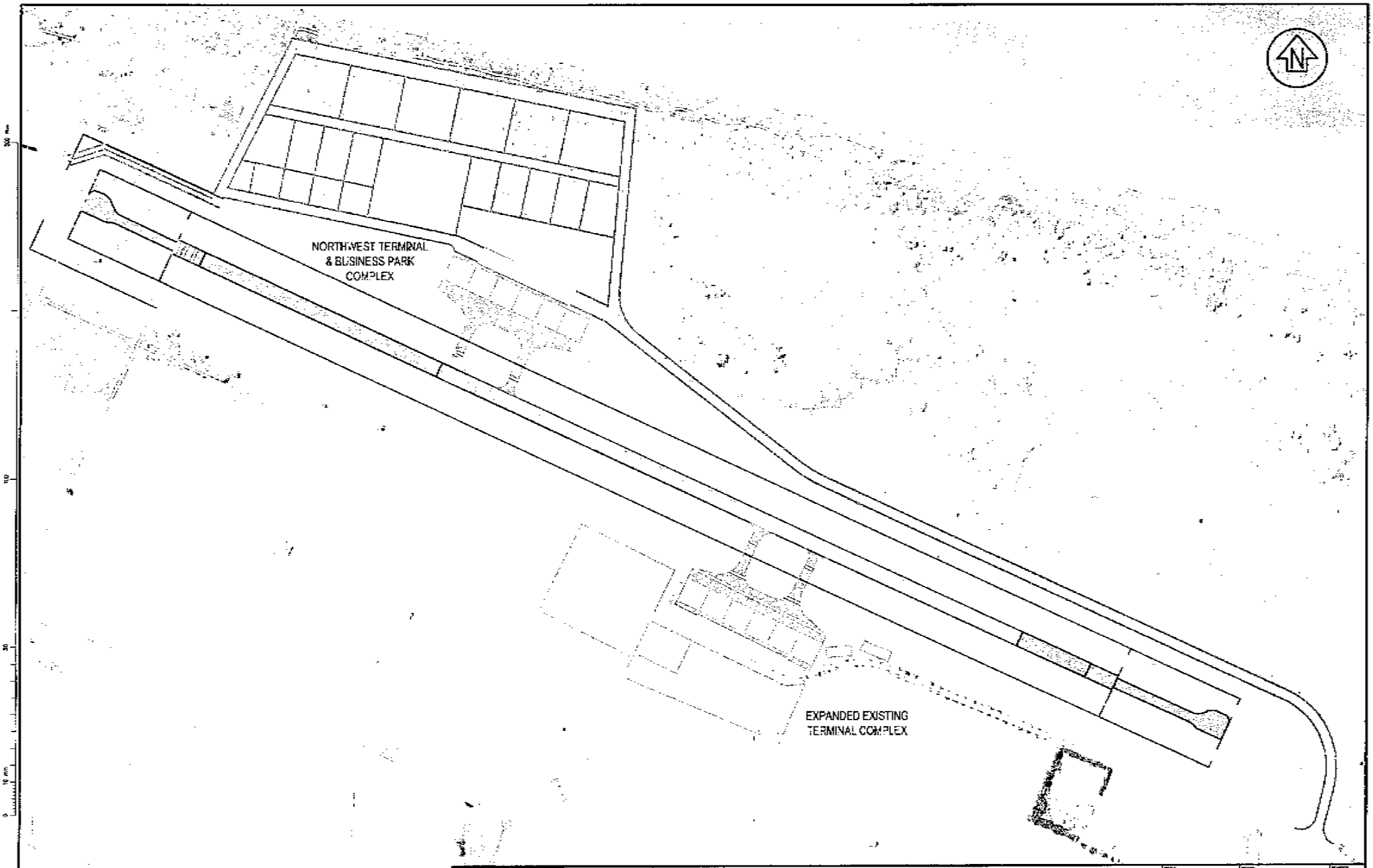
Car park design and preliminary cost estimate												
Earthworks assessment and plan and preliminary cost estimate for preferred sites												

Appendices

Airport Development Plan



LEGEND:
TORA = TAKE OFF RUN AVAILABLE
LDA = LANDING DISTANCE AVAILABLE
RESA = RUNWAY SAFETY AREA

WHAKATANE DISTRICT COUNCIL
WHAKATANE AIRPORT

AIRPORT MASTER PLAN

1:10000 A3

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ISSUE DATE: February 2008

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