

Wellington International Airport Limited

Proposed Runway Extension

Resource Consents Application

28 April 2016



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<b>Glossary of Terms</b>	
<b>AAA</b>	Airport Authorities Act 1966
<b>[the] Project</b>	The construction, operation and maintenance of a 393m extension to Wellington International Airport's runway and associated structures and activities.
<b>AEE</b>	Assessment of Environmental Effects
<b>AES</b>	Aquatic Environmental Sciences
<b>AGL</b>	Aeronautical Ground Lighting
<b>Airways</b>	Airways Corporation of New Zealand
<b>ANB</b>	Air Noise Boundary
<b>ASAD</b>	Accelerate Stop Distance Available
<b>Astral</b>	Astral Aviation Consultants Limited
<b>BAU</b>	Business As Usual
<b>CAA</b>	Civil Aviation Authority
<b>CAQMP</b>	Construction Air Quality Management Plan
<b>CBA</b>	Cost Benefit Analysis
<b>CBD</b>	Central Business District
<b>CIA</b>	Cultural Impact Assessment
<b>CLG</b>	Community Liaison Group
<b>CMA</b>	Coastal Marine Area
<b>CNVMP</b>	Construction Noise and Vibration Management Plan
<b>CTMP</b>	Construction Traffic Management Plan
<b>dB</b>	Decibel
<b>DHI</b>	DHI Water and Environment Limited
<b>DoC</b>	Department of Conservation
<b>EMMP</b>	Ecological Mitigation and Management Plan
<b>ESCP</b>	Erosion and Sediment Control Plan
<b>GA</b>	General Aviation
<b>GDP</b>	Gross Domestic Product
<b>GWRC</b>	Greater Wellington Regional Council
<b>ha</b>	Hectares



<b>ICAO</b>	International Civil Aviation Organisation
<b>IFS</b>	Instrument Flight Rules
<b>ILS</b>	Instrument Landing System
<b>L<sub>Aeq</sub></b>	The A-weighted time averaged sound level over the measurement period t.
<b>L<sub>Amax</sub></b>	The maximum A-weighted sound level of a noise event or measurement period.
<b>LDA</b>	Landing Distance Available
<b>LUDMP</b>	Landscape and Urban Design Management Plan
<b>LUMNIS</b>	Land Use Management and Insulation for Airport Noise Study
<b>m</b>	Metres
<b>m<sup>3</sup></b>	Cubic metres
<b>MBIE</b>	Ministry of Business, Innovation and Employment
<b>MCA</b>	Multi Criteria Analysis
<b>MHWS</b>	Mean High Water Springs
<b>MOWP</b>	Method of Works Plan
<b>MSL</b>	Mean Sea Level
<b>NAVAIDS</b>	Navigational Aids
<b>NIWA</b>	National Institute of Water & Atmospheric Research Ltd
<b>NTU</b>	Nephelometric Turbidity Units
<b>NUMP</b>	Network Utilities Management Plan
<b>NZCAA</b>	New Zealand Civil Aviation Authority
<b>NZTA</b>	New Zealand Transport Agency
<b>OCB</b>	Outer Control Boundary
<b>OLS</b>	Obstacle Limitation Surface
<b>OVR</b>	Over Dimension Vehicle Route
<b>PAPI</b>	Precision Approach Path Indicator
<b>PPS</b>	PAPI Protection Surfaces
<b>Proposed Plan</b>	Proposed Natural Resources Plan
<b>PWA</b>	Public Works Act
<b>REPA</b>	Runway End Protection Areas

<b>RESA</b>	Runway End Safety Areas
<b>RMA</b>	Resource Management Act
<b>RNAV</b>	Area navigation
<b>RNP</b>	Required Navigation Performance
<b>RPS</b>	Regional Policy Statement
<b>Sapere</b>	Sapere Research Group
<b>SCMP</b>	Stakeholders and Communication Management Plan
<b>SH</b>	State Highway
<b>SMAMP</b>	Surf Mitigation Adaptive Management Plan
<b>SSC</b>	Suspended Sediment Concentration
<b>SWFS</b>	Submerged Wave Focussing Structure
<b>TDG</b>	Traffic Design Group
<b>TODA</b>	Take Off Distance Available
<b>TORA</b>	Take Off Runway Area Available
<b>TRC</b>	TRC Tourism
<b>TSP</b>	Total Suspended Particulate
<b>TSS</b>	Total Suspended Sediment
<b>Vpd</b>	Vehicles per day
<b>Vph</b>	Vehicles per hour
<b>WAA</b>	Wellington Airport Act 1990
<b>WCC</b>	Wellington City Council
<b>WIAL</b>	Wellington International Airport Limited
<b>WRS</b>	Wellington Regional Strategy

# EXECUTIVE SUMMARY

## 1. INTRODUCTION

Wellington International Airport Limited (**WIAL**) is seeking resource consents to enable the construction, operation and maintenance of an extension to its runway. The proposed runway extension will be achieved via a reclamation of the coastal marine area. The reclamation area is approximately 10.82ha, and is proposed to be located south of the existing runway in Lyall Bay.

The last major extension to Wellington Airport's (or the **Airport**) runway occurred in 1972. It enabled direct jet services with Australia and enhanced Wellington's connectivity. The Airport currently caters for more than 897,000 international passengers annually. There are up to 70 short haul international return flights every week and it is forecast that this market will grow by at least 15.8% in 2016. It has been identified that larger wide bodied aircraft such as Boeing's B787 and Airbus's A350 have the potential to directly link Wellington with east Asia and western North America, but cannot currently do so because of the current runway constraints at the airport.

Extending the runway will mean around 65% of the world's population will be able to fly within one stop to Wellington. Greater international connectivity will allow businesses to enjoy better access to customers, suppliers, face to face meetings, international labour markets and foreign investors. It will also benefit the tourism sector. Tourism is set to grow considerably, especially from Asia, which has a growing middle class sector with the ability to travel. A new direct entry point into central New Zealand will provide more choice for tourists and more opportunities to access North Island or South Island itineraries. Extending the runway is also likely to benefit Wellington's education sector, where overseas student numbers are increasing but the lack of direct links will continue to be a consideration in their decision to study in the region.

Wellington City Council (**WCC**) has identified long haul flights as one of the "8 big ideas<sup>1</sup>" to help Wellington thrive and views the Project as a major opportunity to change how Wellington City connects with the rest of the world as a city, region and as New Zealand's capital city.

## 2. OVERVIEW OF THE PROJECT

Wellington Airport currently operates a single 1945m runway (Take Off Runway Available (**TORA**)), with 150m protection areas<sup>2</sup> at each end where it is essentially bounded by the CMA. Operational restrictions apply due to the limited land area and location of the Airport relative to the surrounding terrain. At present, Wellington Airport can accommodate a wide range of aircraft types. However, larger Code E aircraft are limited as to range due to the current runway length. Some specific Code E aircraft types such as the Boeing 777 300ER variants, are also unable to land at their

<sup>1</sup> <http://wellington.govt.nz/your-council/news/2014/01/eight-big-ideas>.

<sup>2</sup> Made up of a 90m Runway End Safety Area (RESA) and a 60m Runway Strip.

maximum landing weight. These restrictions limit the growth capability of Wellington Airport and the ability of airlines to provide long haul services direct to Wellington.

To overcome this constraint, it is proposed to extend the runway to achieve a minimum TORA distance of 2,300m retaining the 150m protection areas at each end of the runway. This equates to a 355m extension to the runway (TORA).

The Project will provide three key operational benefits:

- It will enable larger aircraft to operate viable long haul services to and from the Airport. This includes 'small' Code E aircraft such as the Boeing 777-200ER, 787-800/-900 and Airbus A350-900;
- It will enable 'larger' Code E aircraft (such as the Boeing 777-300ER) to operate on 'fifth freedom'<sup>3</sup> long haul routes through Australia and onto New Zealand and then return; and
- It will remove existing restrictions airline operators currently face with 'smaller Code' C aircraft (Airbus A320 or Boeing 737-800) on the longer trans-Tasman and Pacific routes, particularly during warm, still conditions.

WIAL engaged InterVISTAS, an international expert in airline route development, to determine whether current and future market demand will provide profitable and strategic routes for airlines from Wellington Airport. The assessment undertaken by InterVISTAS indicates that:

- Demand for air travel is growing rapidly on a global basis and airlines are responding with orders for new aircraft.
- New aircraft technology and other industry advancements allow airlines to expand into new markets, such as Wellington.
- Wellington is a solid, growing and high yield long haul market.
- Comprehensive traffic and financial analysis indicates there are multiple opportunities for an airline carrier to enter the Wellington long haul market.
- The opportunity strengthens as the market continues to grow through time with more routes and increased frequencies.
- New services are expected to result in incremental passenger growth at Wellington Airport, many of which would be new visitors to New Zealand.
- Based on the analysis undertaken – Wellington long haul services are predicted to be viable and successful.

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<sup>3</sup> The freedoms of the air are a set of commercial aviation rights granting a country's airlines the privilege to enter and land in another country's airspace. The fifth freedom allows an airline to carry revenue traffic between foreign countries as a part of services connecting the airline's own country (e.g. Emirates operating Dubai-Sydney- Auckland and return).

Sapere Research Group (**Sapere**) was commissioned to undertake a cost benefit analysis to determine the likely economic impact of the Project. Sapere concluded that the proposed runway extension will improve the economic efficiency and increase access by individuals and businesses to affordable airline services at Wellington Airport by:

- Allowing “wide-bodied” aircraft, including long-haul code E sized aircraft, movements (not currently possible due to the runway length), resulting in greater passenger and freight loads and lower cost per passenger or kg of freight.
- Reducing the (financial and opportunity) cost of supplying and accessing airline services, particularly “long-haul” services to Asia and the USA that currently involve additional link flights either domestically (e.g. Auckland or Christchurch) or internationally (e.g. Sydney, Melbourne or Brisbane).
- Lowering barriers to increased competition for airline services at Wellington Airport, thereby further increasing the efficiency with which airline services are supplied (e.g. by allowing more efficient carriers operating more efficient wide-bodied aircraft to offer more competitively priced airline services at Wellington Airport).
- Increasing the number of aircraft and passengers using Wellington Airport (e.g. international visitors to New Zealand and New Zealand residents using the airport to travel overseas) and altering patterns of use of airline services at Wellington Airport.

Achieving these efficiency gains would give vent to a range of national and regional strategies and policy documents including:

- The economic development and strategic plans and aspirations of local authorities throughout Wellington and surrounding regions.
- Tourism 2025 framework targets around connectivity, in particular enhancing sustainable air connectivity and improving the distribution of tourism throughout New Zealand.
- Achieving the aims of International Air Transport Policy, especially in relation to continuing the process of air services liberalisation and enhanced competition in the provision of international air services.
- National Infrastructure Plan 2015 ambitions around integrated infrastructure and supporting a strong economy through international connectedness.
- Meeting the goals of the Leadership Statement for International Education to double the value of international education to the New Zealand economy through developing and sustaining mutually beneficial relationships in key markets (many of which overlap with likely direct services possible following the runway extension).

The CBA concludes that the real economic benefit of the runway should substantially exceed its estimated cost (on the basis of current Government draft guidelines for estimating costs). Extending the runway would produce a net economic benefit for the nation of around \$2.3 billion in today's dollars. Around \$8 of economic benefit would be added for each dollar spent on lengthening the runway. The analysis of how the net benefits would be distributed among stakeholders (including airports, airlines, users, and other sectors of the community) found that under the proposed runway extension scenario, the main beneficiaries are the users of air services and the wider community.

The CBA necessarily focuses on national level costs and benefits. However, it is also reasonable to expect that the Wellington region will gain significantly from the proposed runway extension. Wellington is currently one of five 'gateway' cities in New Zealand. A gateway city is the first place a tourist visits but is not necessarily the sole or principal destination for the tourist. It is estimated that the proportion of tourist expenditure in the gateway city is around 31%. Hence, the Wellington region might expect almost a third of the net benefits of the additional visitor expenditure and this would equate to between \$570 million and \$1.9 billion.

Recognising the latent demand and likely benefits of removing the existing barriers to growth imposed by the existing runway length established in the previous sections, WIAL considers that a viable case to extend the runway at Wellington Airport exists. This is further supported by the January 2016 announcement by Singapore Airlines to introduce services via Canberra to their hub airport, Changi and beyond, as well as discussions<sup>4</sup> WIAL has had with other new entrant<sup>5</sup> airlines but are prevented from establishing either long haul or Trans-Tasman operations due to the operational limitations imposed by the current runway length.

Acknowledging that to extend the runway at Wellington Airport would necessarily require reclamation into either Lyall Bay or Evans Bay to the north and south respectively, WIAL has also undertaken a detailed analysis of known aircraft and potential route characteristics to determine the optimal runway length. Undertaken by Astral Aviation Consultants (**Astral**), this analysis has concluded that extending the runway to a minimum TORA of 2300m would enable Wellington Airport to handle most Code E aircraft types, in particular those smaller types more suited to meet the Wellington market demand, with a viable load capacity to and from East Asian and west North American destinations. The proposed runway extension would also enable all Code E aircraft to operate on 'fifth freedom' long haul routes through Australia and onto New Zealand and then return.

Accordingly, in 2013 WIAL commenced detailed planning for extending the runway, with the first stage being the identification of a viable engineering solution for the proposed runway extension.

A number of options have been considered, including extending the runway north into Evans Bay, south into Lyall Bay or a combination of the two. Extending south into Lyall Bay was determined to be the most feasible engineering option.

<sup>4</sup> These discussions remain commercially sensitive.

<sup>5</sup> To the Wellington market.

### 3. DESCRIPTION OF THE EXISTING ENVIRONMENT

The existing 110ha WIAL site is an operating international airport. The Airport is essentially bounded by Lyall Bay to the west and south and Evans Bay to the north of the runway. Located on the adjacent site to the east of the Airport area, and within the Airport and Golf Course Recreation Precinct is the 31.2ha Miramar Golf Course. The Airport was established on the Miramar Peninsula in 1908 and has been a constant in the surrounding environs since that date.

The Airport and Golf Course Recreation Precinct is surrounded by the residential suburbs of Miramar, Rongotai, and Strathmore Park. Rongotai is located on predominately flat land to the west of the Golf Course Recreation Precinct, while the suburbs of Strathmore and Miramar are located both on flat land and the hills to the east and north east.

The Airport Retail Park is located within the Airport and Golf Course Recreation Precinct, with further commercial and light industrial activity to the north west (Rongotai) and north east (Miramar) of the Golf Course Recreation Precinct.

The proposed extension will extend the existing runway out further into the Lyall Bay CMA.

Lyall Bay is the largest embayment along Wellington's southern coast line, separating the Miramar Peninsula from the rest of the south coast. The climate and weather also have a strong influence on the south coast, especially on the vegetation; and while parts of Lyall Bay are relatively sheltered, the climate and exposure is a major factor that has shaped and continues to shape the environment.

The headlands at the outer ends of Lyall Bay have not been developed for residential or other purposes. Although the headlands are protected as reserves the original native vegetation cover has long been removed and has been replaced by a mixture of young regenerating native species and exotic vegetation, with plant species adapted to the exposed prevailing environments. Throughout the whole of the Lyall Bay there is very little native vegetation, apart from the limited regeneration on the outer coastal headlands, virtually all of the other native vegetation has been planted using a very limited range of coastal species.

The natural beach building processes in and around Lyall Bay have been significantly modified by the historic construction of the Airport, the sea wall, road and residential, commercial and recreational developments. This development has also affected the bay's geomorphic setting and associated hydrodynamic processes.

Around the end of the existing runway and spur-groyne (breakwater), the seabed bathymetry is dominated by the submerged extension of the former rocky reef (that was reclaimed) and gravelly deposits, whereas most of Lyall Bay comprises surface sediments of fine sand (median size of 0.15 mm) or rocky platforms along the periphery of the outer bay. The area north of the spur-groyne and to the west of the original runway reclamation, has accreted since the reclamations, forming a shoal that provides good-quality surfing waves in "The Corner".



There is another surf break to the south of the runway called 'Airport Rights'. Airport Rights is an exposed reef break off the southern end of the runway which only breaks in very large swell and is safe for expert level surfers only. When the wave does break, it is typically a short ride, which normally ends in a powerful close out.

The rest of the bay is made up of average beach breaks which can be good during certain conditions, but generally lack the consistency of The Corner. The breaks ranging from the Maranui end of the bay to the west, (close to The Corner), are dependent on the variable sand banks within Lyall Bay, but are typically good for surfers of all levels.

Coastal water quality in Lyall Bay is very good, with low levels of contaminants in the sand and water column. Lyall Bay CMA comprises of three main aquatic habitats; the water column pelagic environment, sandy seafloor in the main part of the bay, and rocky reefs around the bay's eastern and western margins. The fauna and flora associated with these habitats in the area potentially affected by the proposed runway extension are typical of that in adjacent habitats in Lyall Bay, which in turn are typical of those along Wellington's south coast. The potentially affected areas in Lyall Bay are not critical habitat for any threatened or rare species.

The only commercial fisheries known to operate near Lyall Bay are rock lobster potting and set netting for butterfish, and these are confined to the headlands at Moa Point on the east and Te Raekaihau Point, adjacent to the Te Taputeranga Marine Reserve boundary, on the west.

Recreational activities in the area include dog walking, surfing, kite surfing and wind surfing, surf lifesaving, swimming, fishing, scenic drives, picnics, walking, running, cycling, family outings and plane spotting.

## 4. DESCRIPTION OF THE PROPOSAL

In order to provide a longer runway at Wellington Airport that achieves the specified runway and aircraft design criteria, a number of potential runway options were considered. Following conceptual engineering design and assessment of associated costs, the construction of a runway platform over mostly reclaimed land into Lyall Bay was identified as the most feasible option from an engineering and cost perspective.

The conceptual design that underpins the Project is based on a limited set of geotechnical investigations. More detailed geotechnical investigations will be required to be undertaken to determine the final detailed design. Further, it is possible that depending on the contractor, different methods, other than those outlined in the following report may be adopted, however based on AECOM's international reclamation experience, it is considered that any departure from the suggested methodology is likely to be relatively minor.

In order to construct the runway platform, it is anticipated that a full section rock dyke will be built around the perimeter of the runway extension. This rock dyke will be progressively armoured in layers of increasingly large rock and pre-cast concrete



interlocking units (accropodes). A series of ecological enhancement features are also recommended to be incorporated into the design of the accropodes.

Materials for the rock dyke (including its armour) will likely be sourced from existing quarries in the greater Wellington area – principally the Kiwi Point (Ngauranga Gorge) and Horokiwi (south of Petone) quarries located on SH1 and 2 respectively. Some of the larger rock rip rap may need to be sourced from large rock quarries in the Nelson/Golden Bay area as large sized rocks are scarce in the Wellington.

While the initial geotechnical information indicates ground conditions under the reclamation site are very good, detailed investigations may reveal areas of weakness, which are proposed to be strengthened using a ground improvement method referred to as stone columns.

Once the rock dyke is in place, filling of the reclamation will commence. The indicative construction programme suggests that it may take around 18 – 36 months to complete the reclamation (depending on the source of fill). The reclamation fill is likely to be sourced from existing quarries in the greater Wellington area, or if available, made up of dredged sandy material won from the harbour channel. The total construction programme could take around three to four years.

Improvement of fill material may be required for reduction of both static and liquefaction (seismic)-induced settlements. The land platform will require extensive compacting and settlement, likely involving an extended period of surcharging by the placement of additional fill material to expedite its compaction and/or using ground improvement methods such as vibro-compaction. Once any surcharging is complete, the additional fill material would then be trimmed off the top, transported off site prior to the construction of the sealed runway and the installation of other associated runway infrastructure. The obstacle limitation surfaces (OLS) will be an important consideration in terms of improvement methodology.

Given the significant amount of fill material required for the construction of the reclamation, and that there is a possibility that all this material is sourced from Wellington quarries (with the exception of the larger armour rock which would need to be barged directly to the site) it is possible that all material will be conveyed to the construction site via land based transport methods, with routes centred principally on SH1 or 2. Barge options involving the transfer of fill from quarry to barge (via road trucks) then on to the site have been reviewed, and may be feasible, however whether such an option is selected will be dependent on the final contractor.

That said, any reclamation fill won from the Wellington Harbour channel – should the dredging project by CentrePort gain consent and proceed – would be transferred direct from the dredge to the site.

Assuming all the fill is sourced from land based quarries, access in and around the Airport and through the surrounding area by haulage traffic is proposed via a separate day time and night time haulage route, as explained below.

The daytime route has been designed to work within the existing traffic conditions at existing intersections along the route and includes a separate inbound and outbound route. The inbound route leaves Cobham Drive (SH1) and Calabar Road before entering the airport precinct along Stewart Duff Drive before entering the construction site. The outbound route leaves the work site along Moa Point Road before continuing along Lyall Parade, before turning on Onepu Road and Evans Bay Road before re-joining SH1. This daytime route has the assessed ability to accommodate up to 30 trucks per hour between the hours of 9:30am and 2:30pm, resulting in a maximum of 150 trucks per day.

The night time route uses the same haul route from Cobham Drive (SH1) before entering the Airport precinct via Calabar Road, i.e. an identical route to the daytime inbound route. The night time movements are limited by the need to manage generated noise and the assessment has concluded that a maximum of 160 truck movements would be acceptable on a staggered basis between 10:00pm and 6:00am.

Due to the constraints imposed by the OLS and the associated height restrictions for structures and machinery near the runway, it is anticipated that different methods used to build the rock dyke and fill the reclamation, such as marine based platform barges and land based diggers, may be required for different areas of the reclamation.

Associated works include removal of a hillock at the south western end of the Airport between Stewart Duff Drive and Freight Drive. It is likely that the material removed will be used as fill in the reclamation. Once this area has been levelled, it will be used initially as a construction staging area and then anticipated to be used in the long term for aircraft and car parking purposes.

The existing Moa Point Sewage Treatment Plant ocean outfall passes through the area of the proposed reclamation. An early phase of the Project works will involve protecting this outfall pipe to avoid damage due to placement of the dyke and reclamation fill.

At the outset the proposed runway works will involve the extension of the runway taxiway, requiring the extension of the Moa Point Road tunnel or the construction of a new bridge structure. It is anticipated that Moa Point Road will remain fully accessible to the public and also construction traffic throughout the proposed construction period, although with traffic management processes in place at times.

It is estimated that the construction works will require approximately 50 staff on the site at any one time to fulfil all of the daily construction tasks. Due to Airport and weather constraints, (that could create downtime for the construction programme), it is not proposed to limit the hours or days of operation, and WIAL is seeking flexibility to work over a seven day period, 24 hours per day.

Upgrades to the airfield infrastructure, including grading, paving and utilities will be required in association with the Project, as well as changes to the ground lighting and navigational aid configuration. Subsequent upgrades to the taxiway markings will follow on the completion of the works.

In addition, a series of amenity improvements have been proposed and will need to be constructed. These improvements are detailed below.

### ***Surf Wave Focussing Structure***

A potential adverse effect of the proposed runway extension has been identified as a reduction in the wave heights in Lyall Bay which could impact on the current surfing amenity. To mitigate this potential impact, WIAL is seeking to install a surf wave focussing structure into Lyall Bay which is designed to enhance the surf post-works, and leave the bay in a no-worse state than if the Project were not to occur.

### ***Moa Point Road Improvements***

It is proposed that a series of roading, walking and cycling improvements be made to the western edge of that portion of Moa Point Road stretching from the eastern end of Lyall Parade to the western portal of the Moa Point Road underpass/bridge.

### ***Moa Point Beach Improvements***

At Moa Point Beach it is proposed to reinstate a beach form in the corner where the runway meets the curving beach. This will include enhanced ecological habitat for colonisation by marine life. A gateway landform in conjunction with the landscape treatment at the eastern part of the beach is also proposed, including the intersection of Stewart Duff Drive and Moa Point Road. A scrambling or “rock hopping” path around the eastern edge of the runway extension is also proposed, however this is subject to public safety and aeronautical audits.

## **5. CONSIDERATION OF ALTERNATIVES**

From the outset of the Project, analyses were undertaken indicating that viable passenger loads justifying long haul operations currently exist but are precluded due to deficiencies in the existing runway length. Aviation consultants, Astral, undertook a study of runway options required for viable long haul flights from Wellington to east Asian and western North American destinations. This confirmed the minimum useable length of a runway extension to facilitate such flights, setting the initial design criteria for the Project.

Initially, WIAL had no fixed view on whether the runway should be extended either north into Evans Bay or south into Lyall Bay (or a combination of these two options). Engineering advisors (AECOM) were engaged to determine the engineering viability and construction requirements for either alternative. It was then envisaged that an assessment of environmental effects of both options would be undertaken in order to compare the environmental impacts of each option relative to the other.

Part of the initial engineering feasibility assessment looked at the comparative costs of reclaiming land to extend the runway either north or south. Following this process, it became apparent that extending north would be more challenging and would cost significantly more than a southern extension option (via reclamation). For this reason, it was considered that the northern option was not viable. Accordingly, the focus of the alternatives assessment turned to the engineering feasibility, construction

methodologies and requirements, and assessment of environmental effects arising from of the proposed southern extension. Alternatives to mitigate the effects of the Project were also considered, including an investigation into various haulage routes and their revision post consultation with the affected community.

## **6. CONSULTATION**

Consultation on the Project has been guided by good practice approaches and has included significant levels of interaction with stakeholders at all levels. Extensive use has been made of one on one and group meetings.

In addition, public open days, written feedback, and letters to households have enabled the sharing of information, views and ideas. In addition, web based online material relating to the Project, including full access to draft technical reports and a summary document has been available throughout the process.

Ongoing involvement and communication with the relevant regulatory authorities has also been undertaken as part of the preparation of the resource consent documentation. This engagement and engagement with key stakeholders and affected parties will continue as the Project progresses.

## **7. ASSESSMENT OF EFFECTS ON THE ENVIRONMENT**

Following engineering feasibility assessments into alternative options for the proposed runway extension, WIAL engaged a number of independent experts to assess the effects of the Project on water quality, coastal processes and geomorphology, wave propagation and surf characteristics, geotechnical and hazard management, coastal ecology, landscape, natural character, urban design, traffic and transportation, cultural and archaeological values and on amenity values (noise, visual, dust, and recreation values).

### **7.1 RELIANCE ON ANTICIPATED CONSTRUCTION METHODOLOGY AND FINISHED PROFILE**

Construction effects have been assessed based on a proposed construction methodology provided by the project engineers, AECOM. AECOM has extensive experience with reclamation and airport expansion projects throughout the world. Subsequent detailed design and contractor innovation may result in alterations to the final construction methodology. However the current approach comprises a 'best estimate' based on AECOM's worldwide experience with similar projects. It should be noted that constraints associated with working within and adjacent to an operational airport, and within the CMA have been factored into the proposed construction methodology.

Operational effects have been assessed based on the likely finished profile of the Project.

## 7.2 ECOLOGICAL EFFECTS ON THE COASTAL ENVIRONMENT

Construction related discharges, and disturbance to and deposition on the sea bed have the potential to impact on ecological values within the CMA. Measures will be set in place to ensure any adverse effects arising from potential sediment release are appropriately mitigated.

Although the Ecological Assessment has identified that there are no rare or unique species or assemblages within the footprint of the reclamation, the reclamation will result in the loss of marine habitat for an area of approximately 11ha, and will displace or disturb some fish species and bird life during construction.

The assessments conclude however that the displaced existing species are likely to recolonise within the rock dyke post construction of the reclamation. The re-establishment of paua and kina populations could be hastened by 'out planting' juvenile paua raised in captivity from locally sourced parents. The assessments also identify that habitat enhancement could be achieved by additional measures undertaken by WIAL.

## 7.3 TRAFFIC AND ACCESS EFFECTS

The main traffic generating activities during construction will be the delivery of construction materials to site. There will also be a limited number of traffic movements associated with construction staff travel to and from the site, and servicing vehicles affecting different parts of the local road network.

Transportation of construction materials is proposed to occur Monday to Friday and will involve a day time and night time haulage route, outside of peak hour road network demands. Accordingly construction traffic will be managed so that materials are transported to the site over a staggered hourly basis between the periods 9:30am to 2:30pm and 10:00pm to 6:00am during week days only.

The key to managing construction traffic effects lies in confirming transportation windows that avoid busy commuter traffic peaks, school peaks, business peaks, and weekends, and concentrates movements to the off-peak periods, which afford road capacity and less vehicle and land use conflict. Restricting the maximum number of heavy vehicle movements that can occur on an hourly basis throughout the haulage windows is also necessary from both a traffic and noise management perspective. The proposed hourly heavy vehicle movements are set out below:

One hour period starting	Day Time Route (Figure 1-2)	Nigh Time Route (Figure 1-3)
9.30am	15	
10:00am	30	
11:00am	30	
12:00pm	30	
1:00pm	30	
2:00 – 2.30pm	15	
10:00pm		30
11:00pm		25
12:00am		25
1:00am		15
2:00am		5
3:00am		10
4:00am		20
5:00am		30

Having examined the details of the existing transportation environment across the road network serving Wellington International Airport and the proposed runway construction requirements, the assessment concludes that the existing road network can provide safe and convenient access to and from the proposed work sites with minimal impact on the existing networks.

Broader effects of Airport growth on the City's road network that are attributed to the runway extension have also been assessed. These are not anticipated to be significant, when compared to the increased traffic demand that would occur under a business as usual growth forecast for the Airport.

## 7.4 CONSTRUCTION NOISE

Construction noise is likely to most affect those living close to the Project site, and in particular, those properties along Moa Point Road, with a proportionate decrease in the level of impact as one moves further away from the construction works. It has been assessed that day time noise will generally not cause too much disruption, beyond some nuisance/disturbance during particularly noisy works, although people who stay at home during the day (including those who work from home, are sick or who work shifts) could be more affected by long periods of noisy day time work. There is a potential that recreational users (i.e. surfers, cyclists, walkers) could also be temporarily affected by construction noise.

The Construction Noise Report (AECOM) also assesses proposed night time work during week day nights where it is necessary to use machinery that will penetrate Obstacle Limitation Surfaces (OLS). This will likely cause adverse effects on residents in proximity to the Airport (Moa Point Road residents in particular) and there are a number measures that could be offered to these residents (temporary re-homing,



acoustic insulation and property purchase) to assist in managing these effects. Consultation with Moa Point Road residents is continuing.

## **7.5 AIR QUALITY - DUST**

Given that the reclamation is a large earth moving exercise, unmitigated dust discharges could generate nuisance effects on those using the area or living within close proximity to the Airport, as well as create a potential safety hazard for aircraft.

The assessment concludes that as the Project will utilise a number of mitigation measures (including a continuous dust monitor) emissions will be minimised to within 50m of the source.

## **7.6 CULTURAL AND ARCHAEOLOGICAL EFFECTS**

The Cultural Values Report finds that the general area has a very long association with the earliest Maori and in fact the very early Polynesian explorers lead by Kupe. The report notes that many iwi descend from Kupe. Kupe left a heritage of names which are still in use today. The airport land in Kupe's time was beneath the sea or was part of an island called Motu Kairangi.

The Cultural and Archaeological assessments found there were no Maori or archaeological sites of significance that will be affected directly. It was noted however that the historic Moa Point is located beneath the current runway.

The assessments recognise that water is viewed as taonga or treasure to Maori. It sustains life and is central to Maori life and wellbeing. The report recognises that the mauri of water resources can be compromised through the loss of habitat, discharges and contamination. Maintaining an appropriate level of water quality in the CMA during construction of the proposed runway extension, and mitigating the effects of habitat loss through proposed ecological enhancements is therefore required to also manage the effects on cultural values within the area.

Historically, the area has seen finds of taonga (carved stone and bone items) along with Moa bones and an accidental discovery protocol will need to be put in place during the construction of the reclamation activity.

Consultation with Iwi will also occur throughout the consenting programme and beyond.

## **7.7 COASTAL PROCESSES, WAVE AND SURF QUALITY**

NIWA has considered the effects of the proposed runway extension on coastal physical processes, including coastal hydrodynamics (changes in tidal and wind driven currents); wave heights and wave refraction patterns; sediment transport and coastal geomorphology (storm-scale changes to Lyall Bay and Moa Point beaches) and water quality.

The NIWA assessment found that during construction, de-watering discharges during the embankment fill phase have the potential to introduce plumes into Lyall Bay if a fine-sediment fraction is present in the fill material. However, based on fine-sediment modelling, it was assessed that the risk of any adverse effects on the water column from transient sediment suspension or disturbance events during construction is very low. In addition, erosion and soil control measures to be built into the construction methodology will further reduce the environmental risk from sea-bed disturbances, as well as monitoring of turbidity during the construction period.

In terms of operational effects on coastal processes, other than the effects of the proposed runway extension on wave heights, the effects on coastal physical processes are assessed as being low or negligible. It is however recommended that monitoring of the Lyall Bay beach morphology is undertaken to confirm there are no adverse effects arising from the proposed runway extension.

The proposed runway extension will not be adversely affected by storm surges or sea level rise associated with potential climate change effects.

The DHI assessment looks in more detail at the potential effects on surf quality and swimming safety. It has identified that the proposed reclamation will likely result in changes to the existing surf amenity within Lyall Bay apart from the loss of Airport's Right which is within the proposed footprint of the reclamation. The key findings of report are that:

- The extension will reduce what is called “wave peakiness” which enables the wave to break on a peak and then be rideable.
- Depending on the size and period of the swell, surf rides at:
  - The Corner could reduce by 4% to 8%
  - Middle Beach could reduce by 14% to 29%; and
  - West Beach could reduce by 18% to 27%.

Mitigation is proposed in the form of a wave focusing structure approximately 400m offshore. This structure would be designed to offset the effects of the reclamation by creating a left and right breaking wave which does not exist consistently today. The potential ecological effects and effects of the structure on the shoreline of Lyall Bay have also been considered.

## 7.8 LANDSCAPE AND VISUAL AMENITY

The proposal will extend the existing runway further out into the CMA. This will change the outlook from certain viewpoints and residential properties which currently overlook the area from both the east (Moa Point, Strathmore Park) and west (Lyall Bay, Houghton Bay) of the Airport. The visual and landscape assessment includes a detailed visual assessment, taken from a broad range of identified key viewpoints.

As one would expect, the most pronounced visual effects will arise from those living closest and with direct views to the Project site and those using public spaces in close proximity to it, especially to the east of the site. Moa Point residents will be most



affected by the visual effects of the reclamation. On the western side, given that the form and design of the extension will be similar to what already exists, a high level of integration with the existing environment will be able to be achieved and the visual effects will generally not be significant.

## 7.10 URBAN DESIGN

The urban design assessment concludes that the runway extension is logical in terms of the way in which the urban form of the city has been planned and shaped over time at this location. Wellington benefits significantly from the close proximity of the airport to the city centre. The extension of the runway and the added connectivity this brings fits with the planned concept of Wellington as a compact city, where moving to and from the city and the destinations within is efficient and easy.

The land uses surrounding the airport have generally been recalibrated over time to accommodate increases in the airport's size and function. The houses remaining at Moa Point Road are an exception, and the potential for adverse effects for the residents of these properties is recognised.

The public places where there are interfaces with the airport runway extension include the underpass for Moa Point Road, the more urban-facing edge on the Lyall Bay west side, and the less developed beach side on the east side. The report acknowledges the proposal to enhance the amenity values on the Lyall Bay side by extending a promenade from the well-used 'Corner', where surfers and other users converge, up to the breakwater near the western portal of the Moa Point Road underpass/bridge structure. This will provide additional connectivity and accessibility along the coastal margin than is currently provided.

On the east side of the extension, the interface of the runway extension with the coastal margin will be designed to enhance ecological habitat. It will also improve an existing untidy intersection between the current runway and beach by a considered approach to the design of this area. Wider afield from the beach itself, but also on the east side, the proposed development recognises the opportunity to create an improved landscape at the intersection of Stewart Duff Drive and Moa Point Road as a gateway to and from the south coast.

## 7.11 NATURAL CHARACTER EFFECTS

The assessment observes that natural character of an area depends on the degree to which it has been shaped by natural processes. The highest natural character derives from the presence of natural elements with a natural distribution, arrived at primarily as a result of natural processes. At the lowest end of the scale are environments composed of the constructed elements of human domestic, civil and industrial life.

The proposed runway extension is within a location which is already characterised by a high degree of human induced modification, both in the land and coastal marine contexts. The current coastal edge is altered by the presence of the existing runway. It is considered that the proposed runway extension is therefore consistent with the

existing development, and will therefore not give rise to any significant adverse effects on natural character values.

The greatest degree of change will however occur within the immediate Airport and Moa Point embayment area, where the overall natural character will be altered from low to very low adjacent to the Airport, and from moderate/low to low in the Moa Point embayment area. This is however not considered to be a significant adverse effect, and can in part be mitigated through improved urban design features, beach nourishment and planting, ecological habitat enhancement, and the proposed submerged wave focussing structure.

## 7.12 RECREATIONAL EFFECTS

The recreational assessment describes the recreational activities occurring in and around Lyall Bay and has assessed the effects on these activities arising from the proposed runway extension. It is noted that this assessment also draws in part on the findings of other technical assessments, including that undertaken by DHI into the magnitude of effects of the proposed extension on surf break amenity, and construction noise and traffic effects.

The Report assesses that the proposed runway extension does not appear to threaten the overall value or use of Lyall Bay for recreation. Those activities that would be most impacted are surfing, and to a lesser extent, cycling, during the construction phase. As noted above, a submerged structure is proposed to address the potential effects on wave quality at Middle Beach and West areas of the Bay, and appropriate measures will be in place to minimise any conflict between recreation users and haulage traffic.

## 7.13 OPERATIONAL NOISE

The noise assessment by Marshall Day Acoustics assesses that the proposed runway extension and Code E aircraft would not cause a significant change to overall noise exposure ( $L_{dn}$ ) in the community and noise from aircraft operations would comply with the current Air Noise Boundary (ANB) requirements (which are already set out in the District Plan).

## 8. MITIGATION AND MANAGEMENT OF EFFECTS

Broadly, the actual or potential adverse effects identified by the technical assessments fall into one of two categories. The first being those effects generated by the construction of the runway extension including the rock dyke, bulk fill or infilling of the reclamation, and other associated structures and activities, and the second relating to its ongoing operation.

Construction related amenity effects (such as traffic, noise, dust and visual effects) are temporary, but could generate annoyance or nuisance type effects particularly on those living in close proximity to the construction activity or the proposed haulage routes.

WIAL has endeavoured to work with its experts and the affected community in order to develop an appropriate response or strategy to manage or reduce the severity of these potential amenity effects. Where practicable, WIAL has sought, in the first instance, to avoid generation of potential adverse effects. For example the proposed haulage route accessing the construction site has been reconfigured in response to community concerns.

WIAL will also continue to work with those directly affected by construction related effects to develop an appropriate mitigation response. This could include acoustic treatment of properties, and/or the temporary rehoming during particularly noisy or busy construction periods. For those closest to the construction site (e.g Moa Point residents) WIAL has made an offer to property owners to purchase their properties should the consent be granted and construction is confirmed.

Construction of the rock dyke and infilling of the reclamation is likely to give rise to effects on the CMA. Loss of habitat directly beneath the construction site is unavoidable, and it is proposed to mitigate or offset this loss by the creation of habitat, to encourage or enhance recolonisation by affected species on the new reef area.

Temporary sediment discharges will be managed by installing appropriate sediment control measures as part of the construction methodology and adhering to a suspended sediment limit which has been developed taking into account the known tolerances of aquatic species. Monitoring and/or remediation action is specified to address situations where discharge limits are exceeded. Best practice construction methods will also be adopted in order to reduce the likelihood of the construction activity affecting larger marine mammals, fish or birds.

The construction methodology accounts for the fact that the Airport must remain fully operational during the construction of the proposed runway extension and a Method of Works Plan (MOWP) has been developed in response.

Ongoing effects arising from the proposed runway extension relate to landscape and natural character changes, potential changes to surfing amenity and the potential for increased aircraft noise arising from the operation of larger aircraft in and out of the Airport.

The site is not in an area that is of outstanding natural character, as substantial modification of the coastal environment has already occurred with the existing development of the Airport, and surrounding urban land use activities. The most affected in terms of visual effects are those who live within close proximity to the existing Airport in particular the Moa Point resident. As the distance from the proposed runway extension increases, the visual effects are mitigated by existing development, topography of the foreground or background, and the large expanse of coastal water and other views that remain. The effects on natural character and landscape are able to be mitigated somewhat by the proposed urban design and landscape enhancements that are to be incorporated into the final design of the proposed runway extension and surrounding area.

The effects on surfing amenity within Lyall Bay, are to be mitigated or offset by the proposed submerged wave focusing structure.

The assessment of operational noise has confirmed that aircraft operations post construction of the proposed runway extension will continue to comply with existing District Plan limits, and no further mitigation is necessary. Ongoing monitoring to confirm compliance with these limits will be undertaken, as per the current situation. Where it has been possible to do so, the method of mitigation and/or monitoring recommended has been secured by way of a proposed draft condition. These draft conditions are set out in Chapter 8, Section 8.5 of this AEE.

## 9. STATUTORY ASSESSMENT

A range of objectives and policies in national, regional and local policy and other planning instruments are relevant to the proposed runway extension. The Project was assessed against these provisions with the main conclusions as follows:

- Overall the Project is generally consistent, with and will give effect to (as required) the relevant objectives and policies of the relevant statutory planning documents;
- Wellington International Airport is recognised as comprising regionally significant infrastructure and its growth and development is supported by various policy documents;
- The Project will promote the sustainable management of natural and physical resources. The proposed runway extension will assist in providing for the economic growth of the city, region and nation by improving accessibility and connectivity, and improving the operational capacity and efficiency of the Airport. This in turn will enhance the social, economic and cultural wellbeing of people and communities;
- The Project will sustain the potential of natural and physical resources to meet the reasonably foreseeable needs of future generations and safeguard the life supporting capacity of air, soils, water and ecosystems through the management of effects and mitigation that is proposed;
- To the extent that it has been practicable to do so, the Project avoids, remedies or mitigate adverse effects. This includes measures to manage adverse effects on water quality, ecology, amenity values, landscape and visual, recreational opportunities and public access. This are guided by a series of management plans and conditions, together with an offer by WIAL to purchase the most affected properties along Moa Point Road;
- The Project provides for, and has appropriately responded to the matters in sections 6,7, and 8 of the RMA;
- Overall, the statutory assessment concludes that the Project meets the relevant statutory tests of the RMA.



# 1. INTRODUCTION

## 1.1 BACKGROUND

Wellington International Airport Limited (**WIAL**) is seeking consents under the Resource Management Act 1991 (**RMA or Act**) to enable the construction, operation and maintenance of a 355 metre (**m**) extension to its runway<sup>1</sup> and associated structures and activities (**the Project**). The extension will provide a minimum Take Off Runway Area Available (**TORA**) distance of 2,300m and the total construction footprint of the runway extension is approximately 12.52 hectares (**ha**)<sup>2</sup>. The full extent of the Project will be achieved via a reclamation of the coastal marine area (**CMA**) and is located to the south of the existing runway in Lyall Bay, as shown in **Figure 1-1** below.



**Figure 1-1: Site Context – Proposed Runway Extension South into Lyall Bay.**

A full description of the Project is contained in Chapters 2 and 4 of this report.

The Airport plays a vital role to the Wellington region, connecting residents, visitors and businesses to all parts of New Zealand and to Australia, the Pacific and the rest of the world, significantly contributing to the city and wider region's economy. Passenger numbers are increasing, and WIAL needs to plan for, and accommodate this growth, including investment in essential infrastructure.

The last major extension to Wellington Airport's (or **the Airport**) runway occurred in 1972. It enabled direct jet services with Australia and enhanced Wellington's connectivity. The Airport currently caters for more than 897,000 international passengers each year, and there are up to 70 short haul international return flights

<sup>1</sup> TORA.

<sup>2</sup> Both above and below Mean High Water Springs (MHWS).

every week and it is forecast that this market will grow by at least 15.8% in 2016. It has been identified that larger wide bodied aircraft such as Boeing's B787 and Airbus's A350 have the potential to directly link Wellington with east Asia and western North America, but cannot currently do so because of the current runway constraints at Wellington Airport.

Extending the runway will mean around 65% of the world's population will be able to fly within one stop to Wellington. Greater international connectivity will allow businesses to enjoy better access to customers, suppliers, face to face meetings, international labour markets and foreign investors. It will also benefit the tourism sector. Tourism is set to grow considerably especially from Asia, which has a growing middle class sector with the ability to travel. A new direct entry point into central New Zealand will provide more choice for tourists and more opportunities to access North Island or South Island itineraries. Extending the runway is also likely to benefit Wellington's education sector, where overseas student numbers are increasing but the city's lack of direct links will continue to be a consideration in their decision to study in the city.

Wellington City Council (**WCC**) has identified long haul flights as one of the "8 big ideas"<sup>3</sup> to help Wellington thrive and views the Project as a major opportunity to change how Wellington City connects with the rest of the world as a city, region and as New Zealand's capital city.

## 1.2 WELLINGTON INTERNATIONAL AIRPORT LIMITED

Up to 1990, the Airport was operated as an airport authority under a joint venture agreement between the Crown and the City of Wellington. The Wellington Airport Act 1990 (**WAA**) provided for the incorporation of WIAL the vesting of airport assets and liabilities of the Crown and WCC in the company. The WAA declared the company to be an airport company within the meaning, and for the purposes, of the Airport Authorities Act 1966 (**AAA**).

In August 1998, the Crown sold its 66% shareholding to a group of investors, comprising New Zealand Airports Limited, a company now wholly owned by Infratil Limited. The other 34% shareholding in WIAL continues to be held by WCC.

WIAL is also a requiring authority approved under section 167 of the RMA. This is confirmed by the Resource Management Order 1992 which approved WIAL as a requiring authority<sup>4</sup>.

## 1.3 OVERVIEW OF THE PROJECT

Wellington Airport currently operates a single 1945m runway (TORA), with 150m protection areas<sup>5</sup> at each end. It is close to the CMA at each end of the existing runway. Operational restrictions apply due to the limited land area and location of the Airport relative to the surrounding terrain. At present, Wellington Airport can accommodate a

<sup>3</sup> <http://wellington.govt.nz/your-council/news/2014/01/eight-big-ideas>.

<sup>4</sup> <http://www.mfe.govt.nz/rma/about-rma/roles-and-responsibilities/requiring-authorities/list-requiring-authorities/wellington>

<sup>5</sup> Made up of a 90m Runway End Safety Area (RESA) and a 60m Runway Strip.

wide range of aircraft types. However, larger Code E and Code F aircraft are limited as to range due to the current runway length. Some specific Code E aircraft types such as the Boeing 777 300ER variants, are also unable to land at their maximum landing weight. These restrictions limit the growth capability of Wellington Airport and the ability of airlines to provide long haul services direct to Wellington.

To overcome this constraint, it is proposed to extend the runway to achieve a minimum TORA distance of 2,300m retaining the 150m protection areas at each end of the runway. This equates to a 355m extension to the runway (TORA)<sup>6</sup>.

The objectives of the Project are described below:

1. Maintain and develop Wellington Airport as a nationally and regionally significant physical resource; and
2. Maintain and enhance the positive contribution the Airport makes to economic, social and cultural wellbeing by:
  - (a) Enabling the servicing of new aviation routes to link Wellington direct with long haul destinations;
  - (b) Providing for a more diverse range of aircraft, including wider bodied aircraft based on projected future operations;
  - (c) Facilitating an increased capacity to move passengers and freight between Wellington and the rest of the world taking advantage of the predicted doubling of world air traffic in the next 20 years;
  - (d) Ensuring that any design meets appropriate and relevant Civil Aviation Authority (**CAA**) standards;

and in particular:

  - (e) Investigating, and if appropriate, extending the existing runway including the development of associated infrastructure in order to achieve the above objectives, having regard to, among other things, practicable runway extension alternative options and their attendant costs and benefits.
3. Avoid, remedy or mitigate the adverse environmental effects of extending the existing runway at Wellington Airport by:
  - (a) Selecting and implementing design, construction and environmental management methodologies that are commensurate with the magnitude of such effects and including appropriate measures to mitigate, to the extent practicable, the adverse effects that result from the construction and operation of a runway extension and all associated infrastructure;
  - (b) Managing construction activities associated with a runway extension to enable existing regional, national and international aviation services to continue at Wellington Airport in order to meet the ongoing needs of the national and regional community;

<sup>6</sup> It is noted that there are varying measurements to describe the length of the extension – this is explained in Chapter 4.

- (c) Ensuring that appropriate methods are employed to mitigate, to the extent practicable, any adverse environmental effects arising from the reclamation of land and/or the erection of structures necessary to facilitate an extension of the runway.

The Project will provide three key operational benefits:

1. It will enable larger aircraft to operate viable long haul services to and from the Airport. This includes 'small' Code E aircraft such as the Boeing 777-200ER, 787-800/-900 and Airbus A350-900;
2. It will enable 'larger' Code E aircraft (such as the Boeing 777-300ER) to operate on 'fifth freedom'<sup>7</sup> long haul routes through Australia and onto New Zealand and then return; and
3. It will remove existing restrictions airline operators currently face with 'smaller Code' C aircraft (Airbus A320 or Boeing 737-800) on the longer trans-Tasman and Pacific routes, particularly during warmer still conditions.

The key design criteria for the finished runway at Wellington Airport is set out in **Table 1-1** below.

**Table 1-1: Finished Runway Criteria.**

Key Design Parameter	Design Criteria
<b>Runway Specifications</b>	Minimum 2,300m TORA Minimum 2,150m Landing Distance Available
<b>Protection Areas</b>	90m RESA, plus 60m runway strip
<b>Aircraft Requirements</b>	Code E Aircraft Occasional passage of Code F Aircraft
<b>Taxiway Specifications</b>	107.5m from runway, centre-line to centre-line
<b>Seismic Specifications</b>	Withstand a 500 year seismic event, and withstand a 2,500 year seismic event without catastrophic failure
<b>Wave Environment Specifications</b>	Withstand a 100 year wave event

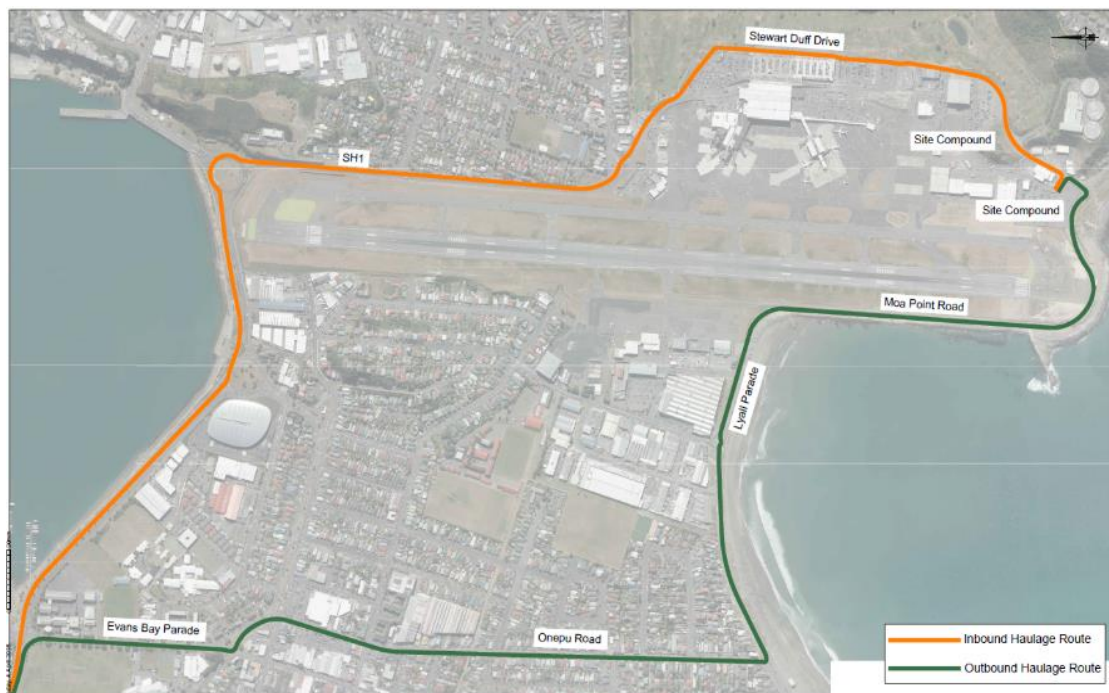
The longer runway will be provided for via the construction of a runway platform over mostly reclaimed land. A number of options have been considered, including extending the runway north into Evans Bay, south into Lyall Bay or a combination of the two. This is discussed further in Chapter 5. Extending south into Lyall Bay is the most feasible engineering option.

<sup>7</sup> The freedoms of the air are a set of commercial aviation rights granting a country's airlines the privilege to enter and land in another country's airspace. The fifth freedom allows an airline to carry revenue traffic between foreign countries as a part of services connecting the airline's own country (e.g. Emirates operating Dubai-Sydney- Auckland and return).

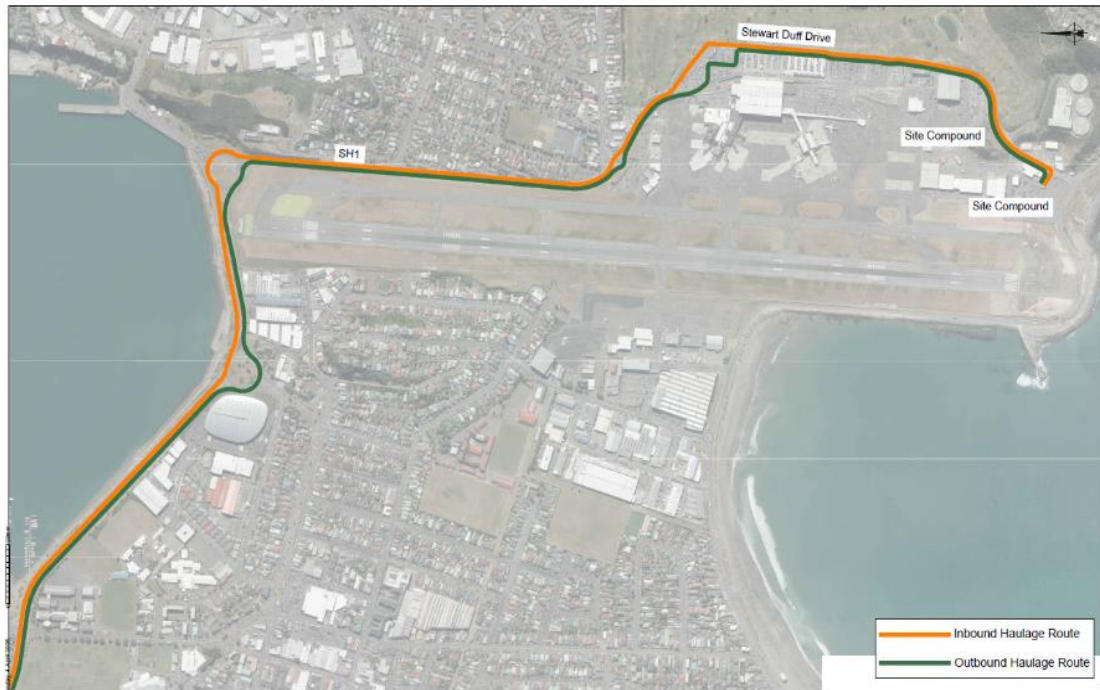


While a detailed description of the indicative construction methodology developed for the extension is provided in Chapter 4, in summary, the extension will involve the construction of a rock dyke around the perimeter which may need to be facilitated by the installation of stone columns. Once the rock dyke is in place, infilling of the reclamation will commence, followed by ground improvement, surcharging (if required) and construction and installation of runway infrastructure. The indicative construction programme suggests that it may take around three to four years to complete construction. A significant volume of bulk fill will be required for the reclamation. This may be in the order of up to 1.5 million cubic metres ( $m^3$ ). The reclamation fill could be either sourced from land based quarries in the wider Wellington area, or from dredged sandy material (if available). Rock dyke materials are likely to be sourced from quarries outside the Wellington region, as suitable large sized rocks are relatively scarce.

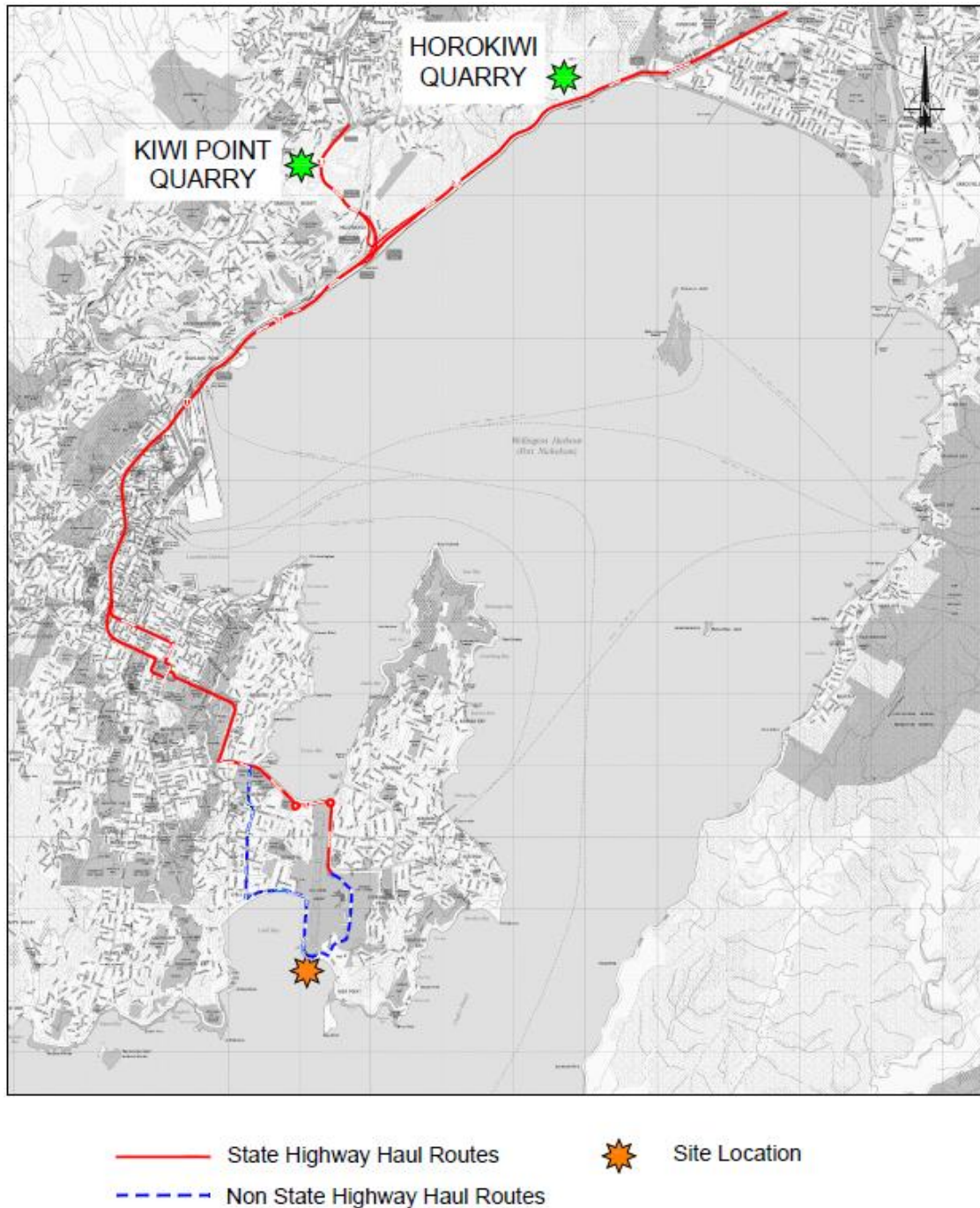
As set out in Chapter 7 of this report, for the purposes of this Assessment of Environmental Effects (**AEE**) it has been assumed that all fill material will be sourced from land based quarries and need to be hauled to the construction site via the road transportation network. The location of the day time and night time haulage routes to and from the construction site is shown in **Figures 1-2, 1-3 and 1-4** below.



**Figure 1-2: Day Time Haulage Route.**



**Figure 1-3: Night Time Haulage Route.**



**Figure 1-4: Haulage Route to and from Land Based Quarries.**

Following the reclamation and construction of the platform, the runway landing threshold<sup>8</sup> will be shifted approximately 360m south of the existing threshold. The start of aircraft roll position will also shift approximately 362m south of the current start of roll. This would alter the take-off position for all aircraft using the runway at Wellington Airport.

The existing tunnel underpass that connects Moa Point Road from the west to the east side of the runway will also be extended to the east, with either a new separate bridging structure, or an extension to the current tunnel.

<sup>8</sup> The location where aircraft commence take-off.

Measures to encourage aquatic species recolonisation and rehabilitation are also proposed to be incorporated into the design of the rock dyke. These features may include:

- The addition of roughened/pitted surfaces on 50% of each accropode;
- Five shallow prisms along the arm of each accropode;
- The insertion of one 1m<sup>3</sup> concrete block with a truncated conical shaped hole in the top layer of the secondary armour every 10m around the perimeter of the rock dyke, positioned between mean low spring and mean high spring tide events;
- Incorporation of differing hole sizes within each accropode to accommodate newly settled lobsters;
- That the rock dyke provides for a range of crevices, overhangs, flat open surfaces and dark shaped surfaces for a wide range of reef fish and invertebrates;
- A sufficiently stable filter bed (where the rock dyke meets the seabed) in order to encourage the attachment and growth of macroalgae.

WIAL is also proposing urban design and landscape treatments in and around the proposed extension. These features are shown in **Figures 1-5** and **1-6** below. Subject to landowner agreement (WCC) provision will be made for a new shared (walking and cycling) path of 3m width along the west side of the straight section of Moa Point to a new lookout point at the existing breakwater. The breakwater area will be enhanced by providing the lookout area and associated amenities such as seating. At Moa Point Beach it is proposed to reinstate the beach form in the corner where the runway meets the curving beach. The purpose of this will improve amenity in the area and ecological functioning. A gateway landform in conjunction with the landscape treatment at the beach will also be introduced at the intersection of the airport road and Moa Point Road. Further details of these amenity improvements are set out in Chapter 4.

To mitigate the potential effects of the proposed runway extension on surfing amenity within Lyall Bay it is also proposed to construct and maintain a submerged wave focusing structure (**SWFS**) within Lyall Bay, located approximately 400m offshore. The approximate location of this structure is also shown in **Figure 1-5** below. This structure would be constructed out of rock material, and would be designed such that it offsets the effects of the reclamation by creating a left and right breaking wave which does not currently exist in the bay and with the potential to improve surf quality within the bay. Further details of this structure are set out in Chapter 4.





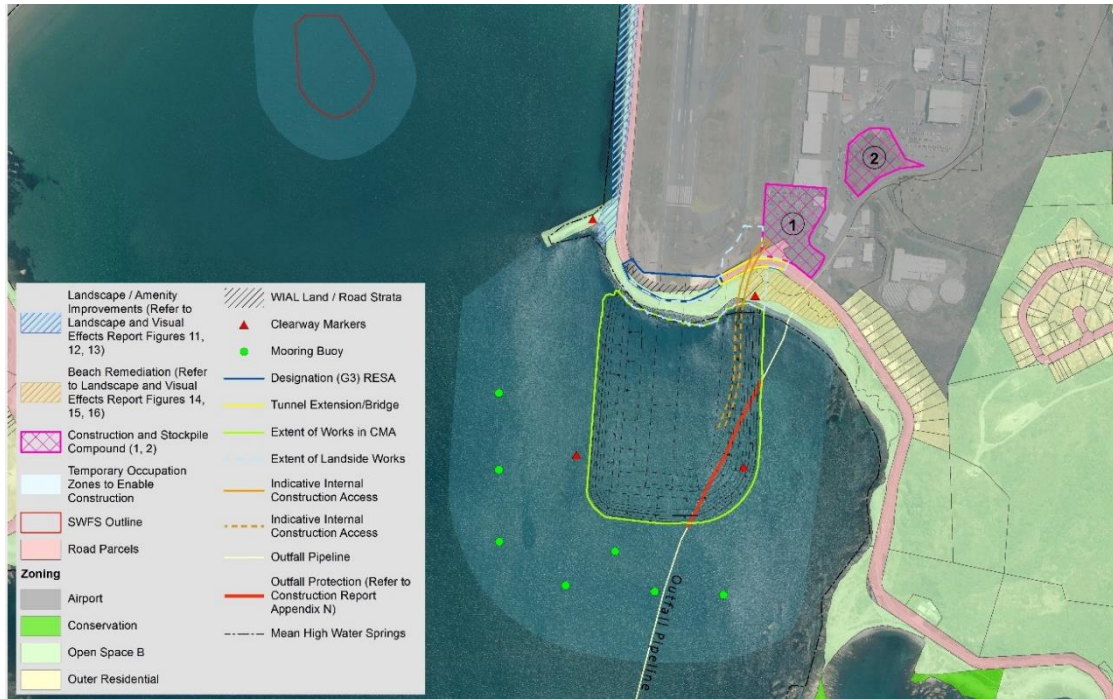
**Figure 1-5: Haul Routes and Areas of Interest**

## 1.4 RESOURCE CONSENT REQUIREMENTS

The Project involves activities which require resource consent under the following plans:

- Regional Coastal Plan for the Wellington Region 2000.
- Proposed Natural Resources Plan for the Wellington Region 2015.
- Wellington City Council District Plan 2000.

The construction footprint and associated activities are shown in **Figures 1-5 and 1-6**. It is noted that for certain elements of the construction methodology (refer to Chapter 4) there are still various options being considered, for example additional mooring systems for barges and vessels associated with the construction of the reclamation. Once detailed design has been completed and confirmation of the fill sources has been made, there will be greater certainty as to the exact nature and location of these features. This may necessitate further consents being required and these will be applied for at that time.



**Figure 1-6: Areas of Interest Southern Detail**

#### 1.4.1 Regional Coastal Plan for the Wellington Region 2000

The total footprint of the proposed runway extension into the CMA is approximately 10.82ha. Of this the area at mean high water springs that is to be reclaimed and become land is approximately 8.1ha. The toe of the proposed runway extension will remain beneath mean high water springs, and will not be considered land. This will become a permanent feature that will need an ongoing coastal permit. The total occupation of the toe of the proposed runway extension which will remain below mean high water springs is approximately 2.72ha and for the avoidance of doubt a separate consent is being sought for this as an ongoing structure in the CMA. During construction a temporary exclusion zone will be created whereby public access will be restricted within an approximately 300m area. This will involve the temporary occupation of a portion of the CMA, as shown in **Figures 1-5** and **1-6**.

**Table 1-2** provides a summary of the activities, the relevant rules and resulting activity status under the Regional Coastal Plan for the Wellington region:

**Table 1-2: Proposed activities either permitted or requiring resource consent under the Regional Coastal Plan for the Wellington Region.**

<b>Consent Type</b>	<b>Activity</b>	<b>Relevant Rule</b>	<b>Activity Class</b>
<b>Coastal Permit</b>	Reclamation of approximately 10.82ha of the coastal marine area.	Rule 4	Discretionary
<b>Coastal Permit</b>	Temporary structures associated with the construction of the runway extension located with the coastal marine area (eg. temporary moorings).	Rule 25	Discretionary
<b>Coastal Permit</b>	The erection of permanent structures within the coastal marine area (eg. toe of the reclamation and rock dyke).	Rule 25	Discretionary
<b>Coastal permit</b>	Ongoing use and occupation of the toe of the reclamation (approximately 2.7ha) where it is below the mean high water mark and structures within the CMA.	Rule 25	Discretionary
<b>Coastal Permit</b>	Disturbance of the foreshore and seabed associated with mooring of vessels during construction.	Rule 40	Discretionary
<b>Coastal Permit</b>	Major disturbance of the foreshore and seabed arising from construction activities and reclamation/Project.	Rule 37	Discretionary
<b>Coastal Permit</b>	Deposition of material into the CMA, and over an existing structure (wastewater outfall pipe).	Rule 46	Discretionary
<b>Coastal Permit</b>	Deposition of material into the CMA during construction activities and associated with the Project.	Rule 46	Discretionary
<b>Coastal Permit</b>	Deposition of sand or other natural material onto the Moa Point Beach foreshore for the purposes of beach enhancement and amenity	Rule 45	Controlled
<b>Discharge Permit</b>	Discharge of contaminants (sediment) and water into the CMA during construction of the runway extension	Rule 57	Discretionary
<b>Discharge Permit</b>	Discharges to the CMA arising from operational stormwater discharges	Rule 53	Permitted

Consent Type	Activity	Relevant Rule	Activity Class
<b>Discharge Permit</b>	Discharge of contaminants to air (namely dust) during construction	Rule 65	Permitted
<b>Water Permit</b>	Diversion and/or dewatering of the CMA during construction to enable the filling and settling of the reclamation to occur	Rule 76	Discretionary
<b>Coastal Permit</b>	Temporary occupation of an area extending out to approximately 300m as shown on <b>Figures 1 -5 and 1-6</b>	Rule 84	Discretionary

#### 1.4.2 Proposed Natural Resources Plan for the Wellington Region 2015

On 31 July 2015 Greater Wellington Regional Council (**GWRC**) notified its Proposed Natural Resources Plan (**Proposed Plan**) for the Wellington region. Under section 86B(3) of the RMA rules in the Proposed Plan have immediate legal effect from this date. Assessment of the activities and consents necessary under the Proposed Plan is therefore also required. On page 15 of the Proposed Plan it sets out that:

*To make it easier to apply for resource consents and to reduce the number of separate resource consents required to undertake any particular activity, the Plan has, where practicable combined associated activities into one rule. The several permissions which may be required under section 9 and sections 12 to 15B of the RMA are included in one rule for which one application for resource consent can be made.*

As noted above, the proposed runway design involves the construction of a rock dyke around the perimeter of the runway extension and building a reclaimed land platform inside the rock dyke. Rule R214 of the Proposed Plan provides for the reclamation and drainage for regionally significant infrastructure activities<sup>9</sup>, including **any associated occupation, destruction, disturbance, deposition, discharges and diversions of water**, as a discretionary activity. Given the note referred to above it is considered that this rule provides comprehensively for a number of the activities associated with the reclamation necessary to build the runway extension. **Table 1-3** sets out the activities and rules relevant under the Proposed Plan.

<sup>9</sup> Regionally significant infrastructure includes Wellington International Airport



**Table 1-3: Resource consents required under the Proposed Natural Resource Plan for the Wellington Region 2015.**

<b>Consent Type</b>	<b>Activity</b>	<b>Relevant Plan and Rule</b>	<b>Activity Class</b>
<b>Coastal and Discharge Permits</b>	Reclamation of approximately 10.82ha ha of the coastal marine area and all associated activities arising from the construction, use and maintenance of the reclamation (including temporary and permanent occupation, destruction, disturbance, deposition and discharges).	Rule R214	Discretionary
<b>Coastal and Discharge Permits</b>	Temporary structures associated with the construction of the rock dyke and reclamation activity and all associated activities arising from the construction, use and maintenance of such structures (including temporary moorings) (including occupation, destruction, disturbance, deposition and discharges).	Rule R155 Rule R159	Restricted Discretionary Discretionary
<b>Coastal and Discharge Permits</b>	Permanent structures (eg. the rock dyke below mean high water springs, approximately 2.7ha) associated with the Project and all associated activities arising from the construction, use and maintenance of such structures. (including occupation, destruction, disturbance, deposition and discharges).	Rule R159 Rule R161	Discretionary Discretionary
<b>Discharge Permit</b>	Deposition of sediment to land above mean high water springs.	Rule R93	Discretionary
<b>Land Use</b>	Earthworks and vegetation clearance above mean high water springs.	Rule R101	Discretionary

Consent Type	Activity	Relevant Plan and Rule	Activity Class
<b>Discharge Permit</b>	Discharge of dust to air during construction of the Project.	Rule R41	Discretionary

### 1.4.3 Wellington City Council District Plan 2000

The proposed runway extension will also involve land which is above mean high water springs and that is within the jurisdiction of the WCC. These activities include:

- Temporary construction activities including:
  - Site offices and associated facilities (ie. toilets);
  - Laydown and stockpiling areas;
  - Construction, modification and upgrading of internal site access ways;
  - Construction, alteration and upgrading of existing network utilities to provide for construction related activities and the long term use of the runway and taxiway;
  - Earthworks and vegetation clearance;
  - Modification and upgrading of existing internal airport access ways;
  - Construction of new site access ways;
  - Modification and upgrading of the Moa Point Road underpass and other associated roading upgrades;
  - Construction of runway infrastructure and structures on land including (but not limited to) ancillary structures, fencing and navigational aids, and landscape/amenity improvements.
- Ongoing use of reclaimed land and the land above road reserve for airport related activities and structures, including but not limited to ancillary structures, utilities, fencing and navigational aids.

With respect to the proposed use of land for airport related purposes (i.e runway) above the Moa Point tunnel underpass (or bridge structure), it is noted that the road reserve is designated in favour of WCC<sup>10</sup> and the necessary approval will be sought to use the land above this space as the requiring authority<sup>11</sup>. The WCC District Plan directs that with regard to the application of District Plan objectives, policies and rules, the Plan provisions of the area in which any formed or unformed legal road is located shall apply. In this case, the Moa Point Road tunnel underpass is adjacent to both the Airport Precinct and Open Space B. The use of land for airport purposes above the road reserve has therefore been considered under both these zones.

<sup>10</sup> Above the current Moa Point Road tunnel and land adjacent in the Open Space B zone an area is already designated for RESA purposes in the WCC District Plan.

<sup>11</sup> Section 176(b) of the RMA

The activities and relevant rules in the WCC District Plan are identified in **Table 1-4** below.

**Table 1-4: Proposed activities either permitted or requiring resource consents under the Wellington City Council District Plan 2000.**

Zone or Relevant Chapter	Activities	Rule Reference	Conditions	Activity Class
<b>Airport Precinct</b>	Construction, use and ongoing maintenance of the proposed runway extension, and associated infrastructure and structures (including fencing and utilities) on land and above road reserve (Moa Point tunnel underpass).	Rule 11.1.1	This activity will not be able to comply with the landscape design requirements (11.1.1.8) in that a grass boundary adjoining Moa Point Road will not be able to be retained.	Restricted discretionary
	Temporary construction activities/compounds including: <ul style="list-style-type: none"> <li>• Site offices and facilities</li> <li>• Compounds and laydown areas</li> <li>• Stockpiles.</li> </ul>	Rule 11.1.1	These activities will not be able to comply with the following conditions: <ul style="list-style-type: none"> <li>• 11.1.1.1.8 - Land based noise operations</li> <li>• 11.1.1.3 - Dust</li> <li>• 11.1.1.6 - Lighting</li> </ul>	Restricted discretionary
	Temporary buildings and structures associated with construction of the proposed Project.	Rule 11.1.2	Any building or structure associated with the construction of the proposed runway extension will comply with the height limits set out in conditions <ul style="list-style-type: none"> <li>11.1.2.1 -</li> <li>11.1.2.3</li> </ul>	Permitted

Zone or Relevant Chapter	Activities	Rule Reference	Conditions	Activity Class
	Modification and upgrading of existing access ways and roads within the Airport Precinct	Rule 11.1.4		Permitted
	Construction of new access ways	Rule 11.3.1		Restricted discretionary
<b>Utilities</b>	Construction of new underground utility structures or underground lines to provide for temporary construction activities, and/or the relocation of existing network utility structures or lines to provide for the construction, operation and maintenance of the runway extension.	Rule 23.3.3	<p>The construction, alteration of and addition to underground utility structures or underground lines:</p> <ul style="list-style-type: none"> <li>on or in Open Space B and C Areas and Conservation Sites that are not on formed legal roads or accessways; or</li> <li>that do not meet the Permitted Activity conditions</li> </ul> <p>are Discretionary Activities (Restricted).</p>	Restricted discretionary
<b>Earthworks Open Space B area</b>	Earthworks in the Open Space B Area	Rule 30.2.1	Earthworks will exceed the permitted cut and fill volumes and will be closer than 20m to the coastal marine area.	Restricted Discretionary
<b>Open Space B (including road area)</b>	Urban design features which are intended to enhance landscape/recreational activities within the	<p>Rule 17.1.7 – Recreation</p> <p>Rule 17.1.7 – Planting</p>		Permitted

Zone or Relevant Chapter	Activities	Rule Reference	Conditions	Activity Class
	Open Space B zone including: <ul style="list-style-type: none"> <li>The creation of a shared path along Moa Point Road and seating</li> <li>Activities associated with the amenity enhancements proposed to the east of the extension including Moa Point beach nourishment, planting and other habitat enhancement and public access features (as shown on Figure 1-5).</li> </ul>	Rule 17.1.11 – Car parking and access in Open Space B  Rule 17.1.14 – Upgrade and maintenance of existing formed roads		
	Hazardous Substances – to be stored and used during construction (ie. diesel, oil, etc).	Rule 17.1.13	Compliance with conditions will be achieved.	Permitted
	Modification of indigenous vegetation (if present) within the construction footprint	Rule 17.2.4		Restricted discretionary
	Any other activity – construction, use and maintenance of the proposed runway extension and associated infrastructure and airport related activities, including the use of land for such purposes above Moa Point Road tunnel underpass in the Open Space B area.	Rule 17.3.2	Any recreational and other activities in Open Space B or Open Space C not specifically provided for as Permitted Activities; - Discretionary Activity	Discretionary
<b>Section 89 RMA and General</b>	Use of reclaimed land for airport related purposes, including but	Section 89 RMA and General	General Provision 3.8.2 of the Wellington City	Open Space B is the directly adjacent zone

Zone or Relevant Chapter	Activities	Rule Reference	Conditions	Activity Class
<b>Provision 3.8.2 of the District Plan</b>	not limited to runway infrastructure, structures and ancillary activities (utilities, lighting).	Provision 3.8.2 of the District Plan	Plan provides as follows: <i>"Where land is, or has been, created by reclamation under a rule in a Regional Plan, any activity associated with the future use of the reclaimed land is assessed against the rules for the adjoining area and the effects on the surrounding area. Where the reclamation adjoins two or more areas, Council will determine which area's rules apply, taking into account activities in the surrounding area."</i>	– under this zone the activity is Discretionary.
<b>Business 1 Zone</b>	Temporary site offices located at the vacant airport land of Kingsford Smith Street / Tirangi Road to the west of the airport (the Kingsford Street Compound).	Rule 34.1.1	Any activity is a Permitted Activity provided that it complies with the standards specified in section 34.6.1 (activities). Given that it is likely that site offices will be established at these sites, compliance with the specified conditions relating to building height, design, noise can	Permitted

Zone or Relevant Chapter	Activities	Rule Reference	Conditions	Activity Class
			all be complied with.	

#### 1.4.4 Overall Activity Status

The application for resource consents for this Project relate to controlled, restricted discretionary and discretionary activities. It is noted however that the principle of bundling consents was established by case law under the RMA. According to the “bundling” principles, where there is a group of activities on one site which are closely associated with each other, or are directed towards one dominant use of purpose, they should be assessed holistically as a single bundle, according to the most stringent activity status. This approach has been taken here, and although Tables 1-2 – 1-4 set out the differing activity classes for the various activities that are requiring resource consent, overall consents for the Project are being sought from GWRC as a discretionary activity, and by WCC as a discretionary activity.

#### 1.4.5 Consent Lapse Date and Expiry

WIAL is seeking a 15 year consent lapse date for all of the consents being sought from both GWRC and WCC. A longer lapse period is being sought due to the complexity of the Project, and will enable WIAL sufficient time to resource the Project, appoint and secure a contractor and undertake detailed design. A ten year expiry date is being sought for all constructed related consents issued by the GWRC (i.e discharges to the CMA associated with construction activities). A 35 year consent term is being sought for all ongoing activities (i.e permanent occupation of the toe of the reclamation structure) from GWRC. An indefinite consent term is being sought for all land use consents issued by the WCC.

### 1.5 LAND OWNERSHIP

The land ownership structure affected by the proposed runway extension and associated activities (including urban design and landscape treatments) is set out in **Table 1-5** below:

**Table 1-5: Land Ownership.**

Area of Work/Activity	Land Owner	Legal Description	Title Reference
Runway Extension	WIAL	<ul style="list-style-type: none"> <li>Lot 1 DP 78304 and Section 1, 5 Survey Office Plan 342914</li> </ul>	116794 518352
	WCC	<ul style="list-style-type: none"> <li>Lot 3 Deposited Plan 78304</li> </ul>	WN45A/75
	WCC	<ul style="list-style-type: none"> <li>Road Reserve</li> </ul>	

<b>Temporary construction activities</b>	WIAL	<ul style="list-style-type: none"> <li>• Part Lot 1 Deposited Plan 78304</li> <li>• Part Section 1 Survey Office Plan 37422</li> <li>• Section 2-3 Survey Office Plan 37422</li> <li>• Section 3 Survey Office Plan 38205</li> <li>• Lots 24, 26 – 28 and 32 – 34 Deposited Plan 21360</li> </ul>	518352 34246 39557 45843 34241
<b>Activities associated with amenity enhancements</b>	WCC	<ul style="list-style-type: none"> <li>• Lot 4 Deposited Plan 78304</li> <li>• Lot 6 Deposited Plan 75384</li> <li>• Lot 7 Deposited Plan 75384</li> <li>• Lot 3 Deposited Plan 2456</li> <li>• Road Reserve</li> </ul>	WN45A/76 WN43B/27 WN428/268

The Project also involves the CMA which is administered by the Crown, as well as land which is owned by WCC as road reserve.

Copies of the certificates of title for the land areas set out in **Table 1-5** above are attached in **Appendix A** to this AEE.

## 1.6 PURPOSE OF THIS REPORT AND REPORT STRUCTURE

This AEE and the technical reports have been prepared in support of applications for resource consent which will authorise, under the RMA, the construction, operation and maintenance of the Project (refer Chapter 4). The application documentation is contained in three volumes:

- **Volume 1** of the application documentation contains the relevant resource management statutory forms.
- **Volume 2** contains the accompanying AEE (this report) and appendices including:
  - Appendix A – Certificates of Title
  - Appendix B – Statutory Context
  - Appendix C - WIAL's Master Plan
  - Appendix D – Draft Construction Management Plan



- Appendix E – Draft Erosion and Sediment Control Plan
- Appendix F – Draft Surf Mitigation and Adaptive Management Plan
- Appendix G – Draft Landscape and Urban Design Management Plan
- Appendix H – Consultation Summary Document
- **Volume 3** contains the technical reports and assessments which have been used to inform the AEE.

The AEE addresses all aspects relevant to the consideration and determination of the resource consent applications being sought. These applications are being filed with the GWRC and the WCC, with a request for direct referral to the Environment Court. Further information on the statutory context for this Project is provided in **Appendix B** and assessed in Chapter 9 of this report.

The structure of this AEE report is set out in **Table1-6**:

**Table 1-6: Volume 2 - AEE Report.**

Chapters	Name	Contents
<b>1</b>	<b>Introduction</b>	Description of the Project Resource Consents Sought Land Ownership
<b>2</b>	<b>Project Overview</b>	Context, need and benefits of the Project Reasons why the runway extension is necessary.
<b>3</b>	<b>Existing Environment</b>	Description of the existing environment Airport surrounds Lyall Bay CMA Surrounding land uses and activities
<b>4</b>	<b>Description of the Project</b>	Detailed description of the activities required to construct and operate the runway extension, including mitigation measures that are proposed – urban design features and the wave focussing structure.
<b>5</b>	<b>Alternatives</b>	Description of the alternatives methods and options to provide for the runway extension
<b>6</b>	<b>Consultation</b>	Description of the consultation undertaken prior to lodgement of the resource consent applications
<b>7</b>	<b>Assessment of Environmental Effects</b>	Provides a summary of the assessments that have been undertaken to determine the likelihood and significance of environmental

Chapters	Name	Contents
		effects arising from the proposed runway extension and associated activities.
<b>8</b>	<b>Mitigation</b>	A summary of the mitigation and other management measures that are proposed.
<b>9</b>	<b>Statutory Assessment and Conclusions</b>	An assessment of the proposal against the relevant RMA statutory considerations and requirements.

Technical reports are attached to this report in support of the applications being sought by WIAL. These are contained in **Volume 3** to this application documentation and are as follows:

**Table 1-7: Volume 3 - Technical Reports.**

Technical Report Number	Title
<b>Technical Report 1</b>	Astral Aviation Consultants – Review of Runway Length
<b>Technical Report 2</b>	InterVISTAs – Route Development Assessment
<b>Technical Report 3</b>	InterVISTAs – Route Forecasts
<b>Technical Report 4</b>	Sapere Research Group – Cost Benefit Analysis
<b>Technical Report 5<sup>12</sup></b>	Raukura Consultants – Cultural Values Report
<b>Technical Report 6</b>	TRC- Assessment of Effects on Recreation
<b>Technical Report 7</b>	AECOM – Concept Feasibility and Design Report
<b>Technical Report 8</b>	Astral Aviation Consultants – Construction Aeronautical Study
<b>Technical Report 9</b>	Traffic Design Group – Traffic Assessment
<b>Technical Report 10</b>	AECOM – Construction Noise Assessment
<b>Technical Report 11</b>	DHI Water and Environment Limited (DHI) – Surf Break Impact Assessment

<sup>12</sup> Note that this report is an earlier draft, prepared in November 2014. It has been subsequently updated by the Cultural Impact Report – Technical Report 13, however it has been included as it provides some useful background and context.

<b>Technical Report 12</b>	AirBIZ – Alternatives Airport Sites Investigation
<b>Technical Report 13</b>	Raukura Consultants – Cultural Impact Assessment
<b>Technical Report 14</b>	DHI – Preliminary Shoreline Assessment
<b>Technical Report 15</b>	National Institute of Water & Atmospheric Research Ltd ( <b>NIWA</b> ) – Coastal Processes Assessment
<b>Technical Report 16</b>	NIWA – Marine Sediments and Contaminants (Lyllall Bay)
<b>Technical Report 17</b>	NIWA – Technical Report on Coastal Hydrodynamics and Sediment Processes in Lyllall Bay
<b>Technical Report 18</b>	NIWA – Ecological Character Report
<b>Technical Report 19</b>	Aquatic Environmental Sciences ( <b>AES</b> ) – Assessment of Ecological Effects
<b>Technical Report 20</b>	NIWA – Assessment of Ecological Effects arising from the Proposed Submerged Wave Focussing Structure
<b>Technical Report 21</b>	AECOM – Construction Air Quality Assessment
<b>Technical Report 22</b>	Kevin Jones – Archaeological Assessment
<b>Technical Report 23</b>	Boffa Miskell Limited – Urban Design Assessment
<b>Technical Report 24</b>	Boffa Miskell Limited – Landscape and Visual Assessment
<b>Technical Report 25</b>	Frank Boffa – Natural Character Assessment
<b>Technical Report 26</b>	Marshall Day Acoustics – Operational Noise Assessment
<b>Technical Report 27</b>	Ernst & Young – Economic Impact of the Proposed Runway Extension

Matters related to the Project which are not covered by this AEE report include:

- Authorisations required under other legislation;
- Alterations to designations;
- Resource consents associated with alternate fill sources – if required such approvals will be sought once the fill source(s) has been confirmed.

## 2. OVERVIEW OF THE PROJECT

### 2.1 INTRODUCTION

This section of the AEE provides a background to the Project and outlines:

- The history of development at Wellington Airport;
- The national, regional and local context of the Project; and
- The need for and the benefits of the Project.

### 2.2 HISTORY OF DEVELOPMENT AT THE AIRPORT

The following timeline **Table 2-1** outlines the development progress and key milestones at Wellington Airport.

**Table 2-1: Wellington Airport Development Timeline.**

Year	Development Activity
<b>1920</b>	Wellington Airport's beginning as the Rongotai Aerodrome as a grass runway aligned east to west.
<b>1929</b>	The Wellington Chamber of Commerce recognised the substantial advantage the region could gain from an airport close to the Central Business District ( <b>CBD</b> ) when it begins lobbying the government for an airport at the Rongotai Location.
<b>1935</b>	Air field developed into a functional airport.
<b>1947</b>	Airport closed due to safety concerns.
<b>1949</b>	Paraparaumu Airport, which had previously been an emergency airport, becomes the country's busiest airport.
<b>1953</b>	Proposal to construct a new Wellington Airport at Rongotai was confirmed primarily because of the isolated location of Paraparaumu, and that the terrain was deemed too dangerous for large planes.
<b>1953 – 1959</b>	Reconfiguration of the Rongotai air field to its current north-south configuration, a major feat of engineering for that time. The works required compulsory acquisition of property under the Public Works Act ( <b>PWA</b> ) and approvals under the Harbours Act, and included: <ul style="list-style-type: none"> <li>- The reclamation of 28 hectares of land (predominantly to the south but also north into Evans Bay) to accommodate the 1630m runway;</li> <li>- The levelling of the large hill between Tirangi Road and Wexford Road; and</li> <li>- The purchase and removal of 150 houses.</li> </ul>
<b>1959</b>	Wellington Airport officially opened. The 'temporary' airport terminal, dubbed the 'tin shed' was a corrugated iron hangar that served as the only domestic terminal until 1986, when Ansett New Zealand built a second terminal at the site.

<b>1972</b>	Further land reclamation to the south to extend the runway by 306m to accommodate DCB aircraft, requiring substantial seawall protection from the coastal exposure to Cook Strait.
<b>1990</b>	The Wellington Airport Act 1990 ( <b>WAA</b> ) provided for the incorporation of WIAL and the vesting of airport assets and liabilities of the Crown and Wellington City Council in the company.
<b>1999</b>	\$116m redevelopment of the entire eastern side of the Airport, including the new Main Terminal Building. The 40 year old 'tin shed' domestic terminal was demolished and the single new terminal, absorbing the then Ansett NZ domestic and international terminal facilities, was completed. The roading network, vehicle parking and aircraft gates were also re-developed.
<b>2005</b>	Commencement of an \$80m expansion and upgrade of the northern terminal (including aircraft gates, baggage and secondary processing facilities, international lounge and increased duty free facilities), including 'The Rock' international terminal.
<b>2007 – 2008</b>	Construction of the RESA to the south, including the Moa Point Road tunnel, and the north RESA. These extensions ensured that WIAL preserved the existing operational functionality of its runway while complying with the increased Civil Aviation safety requirements for a minimum of 90 metre RESA's. The total cost for construction of both RESA's was \$33m.
<b>2009</b>	Complete runway resurfacing project, part of regular maintenance, at a cost of \$11m
<b>2010</b>	Completion of 'The Rock' international terminal expansion.
<b>2011</b>	\$8m development of a Code C sized corporate jet hangar and passenger facility; \$6m extension to the existing level 1 terminal car parking facility.
<b>2013</b>	\$6m development of the terminal car parking facilities to rationalise the available land, delivering an additional 300 spaces. In accordance with its master plan as discussed further below, WIAL has further plans to upgrade the airport facilities and increase its capacity. This includes:
<b>2014 – 2016</b>	\$55m expansion to the domestic terminal (due for completion in late 2016), 2016-2017: \$77m multi-level car parking facility (construction commenced January 2016).
<b>2016 – 2018</b>	\$40m integrated 4-star hotel (due to commence construction late 2016).
<b>2017 – 2019</b>	\$50m International Terminal Expansion (currently undergoing detailed design).

In accordance with its master plan as discussed further below, WIAL has further plans to upgrade the airport facilities and increase its capacity. This includes:

2014-2016: \$55m expansion to the domestic terminal (due for completion in late 2016).

2016–2017: \$77m multi-level car parking facility (construction commenced January 2016).

2016–2018: \$40m integrated 4 star hotel (due to commence construction late 2016).

2017–2019: \$50m International Terminal Expansion (currently undergoing detailed design).

These past, present and future works have created a true city airport with one of the closest links to the CBD in the world. WIAL continues to develop the Airport to a high standard and cater for growth. The Airport hosted close to six million passengers in 2015, and is rated as one of the best airports for service in Australasia.

## 2.3 EXISTING AIRPORT

Today, Wellington Airport has a vital role to play in Wellington's success as a driver for a modern economy. It is a gateway for millions of residents, visitors and business travellers every year, connecting the capital city to all parts of New Zealand and to Australia, the Pacific and onwards to the rest of the world.

The Airport is also a generator of economic growth, providing business and employment opportunities on site as well as in the city and the wider Wellington region.

### 2.3.1 Current Configuration

Wellington Airport operates on a constrained 110 ha site in Rongotai, a residential suburb within 8 kilometres of the centre of Wellington City. The Airport has a single 1945m<sup>13</sup> long runway with a full length parallel taxiway and is close to Evans Bay to the north and Lyall Bay to the south. 150m protection areas are provided at each end of the runway (refer to **Figure 2-1** below).

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<sup>13</sup> TORA (Take Off Runway Available).





**Figure 2-1: Current Configuration of Wellington International Airport.**

### 2.3.2 Current Limitations

The current runway length at Wellington Airport does not provide for the operational requirements of many modern aircraft, including those that currently operate from the Airport. Specifically, the runway length prevents the full range of use by aircraft such as the Boeing 737-800 and Airbus A320. For example, flights by Fiji Airways to Nandi from Wellington utilising a B737-800 requires the operator to block out 27 seats of the 164-170<sup>14</sup> seat capacity aircraft.

Similarly, and as noted in **Technical Report 1**, the existing runway length provides an effective barrier to entry into the Wellington aviation market for many Code E type aircraft. This is experienced in two ways.

Firstly, there is no long haul aircraft that can (or could) fly non-stop to the nearest Asian<sup>15</sup> or US<sup>16</sup> hub airport from Wellington with a viable passenger and freight load.

Secondly, certain aircraft types, such as the Boeing 777-300ER, a common long haul aircraft in the Asia Pacific aviation market, are unable to land at Wellington Airport at their specified maximum landing weight. This prevents the use of such aircraft on 'short-haul' flights, such as to and from Australian airports<sup>17</sup>.

<sup>14</sup> [https://en.wikipedia.org/wiki/Fiji\\_Airways#Current\\_Fleet](https://en.wikipedia.org/wiki/Fiji_Airways#Current_Fleet).

<sup>15</sup> Singapore – Changi.

<sup>16</sup> Los Angeles – LAX.

<sup>17</sup> It is noted that the Singapore-Canberra-Wellington return service announced in January 2016 to commence in September 2017 utilises a smaller Boeing 777-200, which can operate at maximum landing weight at Wellington Airport, albeit can only depart again with enough fuel for an eastern Australia destination.

The Project has been designed to overcome these limitations.

## 2.4 CONTEXT OF THE PROJECT

Modern airports are essential to a region's economy. They enable a link to the world for people and for trade; provide an important hub for business investment and economic development; and increase business competitiveness and attractiveness. They are also important for quality of life enabling people to travel and visit family and friends. New Zealand's geography makes this role even more crucial. Air transport is the most efficient passenger transport mode between most domestic destinations and all international destinations.

Airports are widely recognised as having significant strategic implications for the cities and regions that they serve. At the most obvious level, airports provide inter-modal facilities for the arrival and departure of international and domestic passengers and cargo from road, and, in some cases, rail and other surface transport modes.

There are also other advantages that an airport brings to a community, including improved communication links with other communities and regions within the country and overseas, the provision of medical flight services, and focal points for civil and national defence activities.

### 2.4.1 Global Aviation Market

Global demand for air service is expected to double in the next 15 years. Asia-Pacific is expected to account for 42% of all air passenger traffic globally by 2034. In response to this global increase in demand, airlines have responded with a high volume of aircraft orders.

The types of aircraft are also changing. Since 2005 there has been a reduction in the use of "extra-large" long haul aircraft types (i.e. Boeing 747) in favour of more efficient wide body aircraft such as Boeing 787 and Airbus A350. This new aircraft technology (sometimes referred to as "hub busters") and other industry advancements allow airlines to expand into new markets. Wellington has been identified as one of these potential new long haul routes.

New Zealand and Australia are growth markets for major airlines, and carriers generally add capacity to regions where growth is predicted and it fits with their network strategy. As discussed in the following section, the existing market size for long haul flights at Wellington is substantial, attractive and growing.

The global tourism market is also set to grow<sup>18</sup>. Over the past 10 years, global wealth has doubled, from US \$113 trillion to US \$241 trillion. That growth is projected to continue at an annual rate of 6.5%. As the world's wealth increases and the world's economic centre of gravity shifts from west to east and thus closer to New Zealand, very valuable opportunities are emerging for New Zealand and New Zealand tourism.

<sup>18</sup> Source: Tourism 2025 ([www.tourism2025.org.nz](http://www.tourism2025.org.nz)).



An increase in wealth is a stimulus for travel, and the outlook for tourism globally is bright. The Asia-Pacific region's share of the global middle class is expected to rise from just over one-quarter today, to two-thirds. New Zealand is already experiencing the benefits: in 2013, China became not only the country to which New Zealand exports more goods than any other, it also moved into second place behind Australia as New Zealand's second largest visitor market. The significance of this is clear when reviewing the State of Tourism Industry Report 2015, which notes that the average Chinese visitor spends \$4,265 and stays for 19 nights, whereas the average Australian visitor spends \$1,746 and stays for 11 nights.

### ***The Wellington Aviation Market and the Airport's Role in the Regional Economy***

Visitor numbers to Wellington are strong, both in the domestic and international markets. Wellington City saw 1.4 million domestic commercial guest nights in 2014, and there were 184,352 international visitor arrivals to Wellington in 2014 (equating to a 23% increase since 2010). Over the last 12 months, passenger numbers at Wellington Airport have increased by over 6%, higher than any other major airport in New Zealand. Passenger numbers are expected to reach more than 5.7 million in 2016 to double to 10 million by 2030.

Wellington is the main gateway to the lower North Island and central New Zealand, and is New Zealand's second largest city as measured by urban population. As the capital of New Zealand, it is the seat of central Government and the location of the most consular representation in New Zealand, as well as the location of the New Zealand Stock Exchange.

The Wellington region is the second largest regional contributor to the New Zealand economy, behind Auckland. The area generates \$53.3 billion in GDP, almost 30% of New Zealand's total. Over the period 2007 – 2010, GDP growth in central New Zealand was 30% higher than the New Zealand average and almost twice as high as the upper North Island.

The Wellington region has a significant tertiary education and research sector, including four universities and three institutes of technology/polytechnics.

Reflecting the importance of Wellington to the New Zealand economy, and the constrained international connectivity of Wellington regional businesses in overseas markets is a national issue. Additional costs and foregone economic activity, arising from the runway and aircraft constraints at Wellington Airport have adverse flow-on effects beyond the Wellington region. In particular, the impacts will be felt as mobility of people to and from regional areas within the catchment of Wellington Airport are reduced, or become more costly. This is likely to have flow-on effects at a national level.

## **2.4.2 Long Term Planning and the WIAL 2030 Master Plan**

A major aspect of successfully maintaining and operating an airport resource is having a robust and accepted development strategy. Such a strategy generally will include a plan for the airport, the identification and strategies for the protection of land for existing

and future airport development and operations, and the provision of an aircraft noise buffer for the surrounding community.

Airport planning requires a long term view and a commitment to put resources towards planning and protecting for the future.

Aviation is a long term growth industry. In the short term there can be high volatility, marked by the introduction (and occasional withdrawal) of new services, airlines and aircraft types. It is susceptible to fluctuations in the price of fuel as well as other macro-economic movements, however over longer periods the growth in air travel is consistent. Therefore, and acknowledging the short term potential volatility, airport planning remains a dynamic and flexible discipline, all the while with a mind to the ongoing long term growth.

While not a requirement in the New Zealand legislative context, well managed airports such as Wellington recognise the importance of having a Master Plan in place.

Wellington Airport's current master plan adopted in 2010 sets out its vision for development and growth for a 20 year period, to 2030. It provides a framework for the Airport's future, building on the developments that have occurred over the past few decades, and the previous Master Plan which was prepared in 1994. The current Master Plan is attached to this report as **Appendix C**.

A key aspect of the Master Plan is to enable the Airport to accommodate forecast growth in passenger numbers and freight volumes. The Master Plan also recognises that the introduction of new long range aircraft types will result in new opportunities for Wellington to join the global air travel network through direct connections to new markets. The Master Plan anticipates that Wellington Airport will invest more than \$450 million in infrastructure, including runway improvements, aircraft parking stands, additional terminal space and car parks. Much of the early staged development anticipated by the Master Plan (out to 2020) is now either nearing completion or in train for completion.

Relevant to the Project, the 2010 master plan also acknowledges that regulatory or operational imperatives<sup>19</sup> may require the Airport to consider extending the runway in the future. The options identified in the Master Plan include:

- A 100m extension at the northern runway end.
- A 500m extension at the southern runway end.

### 2.4.3 National Policy Direction

At a national level, the Airport and the Project fits within a number of strategic initiatives including:

- "Connecting New Zealand 2011", which sets out the government's policy direction for the New Zealand transport sector;

<sup>19</sup> At the time the Master Plan was prepared, information available from Boeing and Airbus suggested that the yet to be constructed B787 and A350 (respectively) prototypes would be able to operate viable long haul services from the existing runway. Subsequent development delivered aircraft that underperformed against those initial expectations.

- International Air Transport Policy Statement;
- National Infrastructure Plan 2015; and
- Tourism 2025.

#### **2.4.3.1 Connecting New Zealand**

“Connecting New Zealand 2011” summarises the government’s policy direction for the transport sector. It supersedes the New Zealand Transport Strategy 2008 and is based on the government’s three key themes for the development of the transport system over the next 10 years:

- Economic growth and productivity;
- Value for money; and
- Road safety.

Connecting New Zealand 2011 recognises that the transport system is an important enabler of economic growth and is intended to help transport stakeholders better understand what the government is seeking from the transport system. With regard to the aviation sector, the document reports that international trade in air services is vital to supporting growth in the tourism industry, and trade in goods carried by air.

In a global system that dates back to the 1940s, inter-government arrangements must be in place before international airlines can operate scheduled air services. New Zealand already has around 48 such relationships. Since 1998, ‘open skies’ arrangements have been negotiated with many of New Zealand’s major developed country markets, including Australia, the United Kingdom, the United States, Germany and Canada.

The government is working to further remove restrictions within these existing arrangements, while at the same time opening up new relationships well ahead of demand, so that airlines and airports can plan with certainty about rights being available and respond with speed to changing market demands. In particular, the government will give priority to expanding opportunities in the fast-growing economies of South and East Asia, and South America.

#### **2.4.3.2 International Air Transport Policy Statement**

The Ministry of Transport website ([www.transport.govt.nz](http://www.transport.govt.nz)) reports that aviation connects New Zealand and New Zealanders to the world, provides access to global markets, and generates trade and tourism. It goes on to say that air services are vital to New Zealand’s economy, with almost all tourist arrivals, and 14% of exports by value, being carried by air. Inter-governmental arrangements must be in place before international airlines can operate scheduled air services. The government will continue to negotiate new air service agreements to provide more access to key and feature trade markets for New Zealand. It will implement this via the following strategic documents and policies:

- International Air Transport Policy.
- Air Services Agreements.

- International airline licensing.
- International non-scheduled commercial services.
- Alliance and codeshare agreements.

In 2012, the government confirmed the International Air Transport Policy Statement. This policy is aimed at growing the economy by providing New Zealanders with better access to the world and facilitating increased trade in goods and services. The objective to this Policy Statement is:

*To help grow the economy and deliver greater prosperity, security and opportunities for New Zealanders. This will be achieved by seeking opportunities for New Zealand-based and foreign airlines to provide their customers with improved connectivity to the rest of the world, and to facilitate increased trade in goods and services (including tourism).*

The Policy:

- Recognises that New Zealand's small population and relative isolation from its major trading partners are significant competitive disadvantages in terms of our ability to attract and secure new air services;
- Reaffirms New Zealand's desire to pursue greater liberalisation in international air services, providing freer access for international airlines; and
- Recognises that a liberal air services policy, which seeks to remove regulatory constraints on air services, is a necessary tool to help ensure that the best possible social and economic outcomes are delivered to the benefit of all New Zealanders.

The New Zealand government is pursuing this policy through:

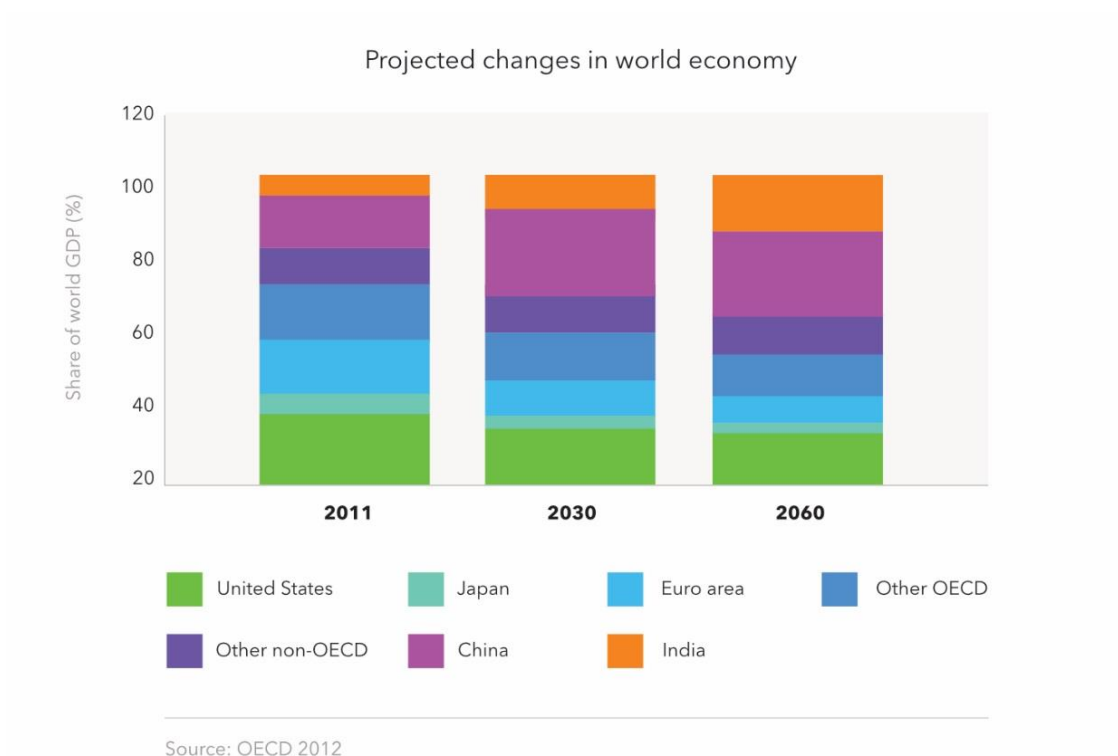
- Reciprocal open skies agreements, except where it is not in the best interests of the country as a whole. Such Air Services Agreements typically provide for:
  - No restrictions on routes, capacity or traffic rights (including 7th freedom and cabotage - 8th and 9th freedom - rights).
  - No regulation of tariffs, except to prevent anti-competitive behaviour liberal arrangements for granting operating authorisations following receipt of designation.
  - Provisions facilitating regulatory cooperation by civil aviation authorities on matters such as trade in aviation goods and services.
- The most open package of air services arrangements that is in New Zealand's overall short and long term best interests is in those cases where the other party will not agree to open skies agreements. In so doing, the Government has indicated its intention to "... balance an exchange of sufficient capacity for services that airlines plan to offer in the short to medium term, with the long term objective of open skies".

### 2.4.3.3 National Infrastructure Plan 2015

The 30 year New Zealand Infrastructure Plan 2015 was developed by the National Infrastructure Unit on behalf of the government. The plan sets out a vision that: *By 2045 New Zealand's infrastructure will be resilient and coordinated, and contribute to a strong economy and high living standards.* The Plan recognises that infrastructure is the foundation on which so much of New Zealand's economy relies, whether it is reliable electricity, clean drinking water, or transportation networks. Over the next 10 years, approximately \$110 billion is forecast to be spent on infrastructure in New Zealand. The Plan sets out that, although New Zealand has a good national infrastructure base, infrastructure planning in New Zealand faces some big challenges including:

- Aging assets and infrastructure networks;
- Affordability constraints;
- Population aging;
- Regional growth and decline;
- Infrastructure pinch points, especially in Auckland;
- Technology change and cyber security risk;
- Shift in economic gravity towards Asia and the opportunities this provides; and
- The climate is changing and New Zealand's natural resources are under pressure.

Key challenges, including the shift in economic gravity towards Asia are also recognised as potential growth opportunities for New Zealand. The Plan sets out that this requires decision makers to fully consider the needs of, and opportunities for, regional economics when forecasting infrastructure demand, and underpins the need for good international connections, and effective roads, rail and broadband to link New Zealand regions with its cities and the global market place. The following figure (**Figure 2-2**) shows the projected changes in the world economy to 2060:



**Figure 2-2: Projected Changes in World Economy.**

The plan sets out a response and an action plan to address these challenges which has a particular focus on:

- Developing national, shared data standards for infrastructure;
- Establishing regional centres of excellence or similar arrangements to support decision-making;
- Investigating options to support long term, integrated regional infrastructure plans;
- More transparent infrastructure pipeline data;
- Investigating options for enhanced procurement governance for larger procurements;
- A longer term review of planning legislation and alignment;
- Updating the RMA to improve the national planning framework; and
- Developing a Trans-Tasman procurement market with Australia.

Furthermore, resilient infrastructure requires a level of integration (both across infrastructure types and between regions), particularly in relation to transport. In particular, the Plan makes reference to three factors that would lead to a transport network that will support international connectedness and a strong export economy through:

- Continued negotiation of new Air Services Agreements, both bilaterally and multilaterally, to provide more access to New Zealand's key and future trade markets.

- The maintenance of the National Freight Demand Study to provide up-to-date forecasts to guide freight infrastructure investment and land-use planning decisions across the public and private sectors.
- The review of the CAA, which will improve the framework for regulating competition in international air services and allow the industry and government to be more responsive to technological changes.

#### 2.4.3.4 Tourism 2025

Tourism 2025<sup>20</sup> sets out a growth framework for New Zealand's tourism industry. It is a cohesive plan which seeks to grow tourism volume and value. It sets an aspirational goal of \$41 billion total tourism revenue in 2025. The plan is a high-level strategic document that aims to provide the tourism industry in New Zealand with an informed sense of direction.

One of the key drivers identified in the plan is growing sustainable air connectivity and the need to disperse tourists regionally. New Zealand is an island, and 99% of its international visitors arrive by air, so increased air connectivity is crucial to the success of the New Zealand tourism industry.

Tourism 2025 identifies that New Zealand needs long term growth in air capacity, and that the industry will gain most from new air links being established on routes that are able to grow. This will bring increasing volumes of visitors and generate an ever-increasing brand presence for New Zealand as a destination.

Tourism 2025 recommends that New Zealand must target growth economies with an increasing number of middle class consumers. The Global and New Zealand Outlook theme of Tourism 2025 has identified the regions that are forecast to have the greatest growth in household incomes. This indicates that New Zealand will have its strongest opportunities for growth in the Pacific Rim and new Asian markets.

#### 2.4.4 Local Government Policy Direction

The Airport and the Project also align with a number of inter-related strategic local government initiatives and policies including:

- Wellington Regional Strategy 2012;
- Wellington Visitor Strategy 2015; and
- The Wellington City Long Term Plan 2005 - 2015

##### 2.4.4.1 Wellington Regional Strategy 2012

The Wellington Regional Strategy (**WRS**) is a sustainable economic growth strategy which was set up to enhance the region by building Wellington's economy and helping to develop into an internationally competitive region. It aims to build a resilient, diverse economy that retains and creates jobs (especially high value jobs), supports the growth of high value companies and improves the region's position in relation to the national

<sup>20</sup> Tourism 2025 ([www.tourism2025.org.nz](http://www.tourism2025.org.nz)).



GDP and national employment. The WRS recognises that the region must maintain its internationally competitive quality of life if it is to attract and retain talent.

The WRS was developed by nine local authorities in the region, working in tandem with central government and business, education, research and voluntary sector interests and is implemented by Grow Wellington, the WRS Office and local councils, along with other key partners.

The WRS is a long term strategic vision for the region which is centred around six focus areas:

- Commercialisation of innovation;
- Investment mechanisms for growth;
- Building world-class infrastructure;
- Attracting business, investment and talent to the region;
- Education and workforce development to service regional economy needs; and
- Open for business.

A number of these focus areas are relevant to Wellington Airport and the Project. The WRS recognises that regional economic prosperity is heavily dependent on the region's level of connectedness and resilience at local, national and international levels. It notes that this is also dependent on the quality of the foundation infrastructure and transport systems.

The WRS sets out that<sup>21</sup>:

*“Wellington is the only city in New Zealand that sits on the axis of the national road and rail network, is centrally located and has quality air and sea ports. Businesses flock to transport hubs and build around them, providing supporting services and over time new industries. Improving the region's economic foundations has been a continued focus of the WRS. There are gains to be had from building world-class infrastructure and facilitating improved transport, broadband, energy security and other infrastructure services for the region. There are also opportunities to use existing infrastructure more efficiently and effectively”.*

One of the key outcomes of the strategy is to enable the construction of world-class airport infrastructure with the capacity to attract long haul flights to/from Asia, thereby building high level connections to Asia from Wellington Airport.

#### **2.4.4.2 Wellington Visitor Strategy 2015**

Wellington is currently experiencing strong visitor growth. The dynamic tourism industry is currently contributing \$1.4 billion each year to the Wellington regional economy, with tourism and hospitality providing an estimated 16,000 full-time equivalent jobs to the region.

<sup>21</sup> Wellington Regional Strategy 2012, page 12.



The Wellington Visitor Strategy 2015 outlines how further visitor growth to Wellington is to be fostered, and specifically includes:

- Clarifying the roles and responsibilities of the key stakeholders in Wellington's tourism sector and in the delivery of the visitor experience;
- Setting clear action points for planning, investment in, and development of Wellington's tourism product and infrastructure. A series of action points are directly relevant to this Project and seek to:
  - Work with all airlines utilising the Airport in order to increase capacity into Wellington from all ports and work to ensure flight scheduling allows all visitors to maximise the opportunities that Wellington provides;
  - Identify potential new entrant airlines<sup>22</sup> to utilise the Airport and advocate for discussions between them and WIAL;
  - Monitor the airlines utilising the Airport for volume and appropriate frequency of flights;
  - Attract at least one airline to fly daily long haul services, most likely from South East Asia by 2015.
- Providing a platform to drive even more effective and efficient outcomes from marketing activities.

WIAL is a key stakeholder in the Wellington regional tourism industry, and is classified as regionally significant infrastructure, as defined in the Greater Wellington Regional Policy Statement.

#### 2.4.4.3 Wellington City Long Term Plan 2015-2025

In accordance with the Local Government Act 2002, a local authority must have a Long Term Plan in place at all times. The Long Term Plan also describes how each Council will fulfil its responsibilities under the Local Government Act 2002 to promote the well-being of its community, and enable democratic local decision-making. It includes Council's community outcomes, and informs the community how the Council's activities will help achieve these outcomes. The Long Term Plan is prepared in consultation with the community, which is given an opportunity to review a draft and make submissions prior to the Long Term Plan being formally adopted by Council.

The Wellington City Long Term Plan 2015–2025 sets out the Council's overarching long term strategic vision for the city. This vision is called *Wellington Towards 2040: Smart Capital* and it aims to grow and sustain the city as an 'inclusive place where talent want to live'. The strategic vision is supported by four community outcomes or long term goals:

- **Connected city** – *with improved physical and virtual connections, Wellington can unleash the potential of its people and businesses. Technology reduces the city's physical distance from the world and markets, and the city's compactness allows for relationships to form with ease.*

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<sup>22</sup> To the Wellington Market.

- **People-centred city** – cities compete more for people, in particular the highly skilled, educated people who already make up a large proportion of Wellington’s population. It will become increasingly important to draw on these strengths, to ensure the city is open, welcoming, vibrant and embraces diversity.
- **Eco-city** – we will build on our current environmental strengths to transition to a low carbon future. As an eco-city, Wellington will achieve high standards of environmental performance, coupled with outstanding quality of life and an economy increasingly based on smart innovation.
- **Dynamic central city** – by fostering the central city as a hub of creative enterprise, we can lead the region to the next level in economic transformation. With universities, research organisations and creative businesses all clustered in or near the central city, Wellington can grow, taking the wider region to the next step in prosperity and quality jobs.

The Long Term Plan identifies that the Council provides and supports services and initiatives to grow the city’s economy and enhance the quality of life for Wellingtonians. One of the key projects identified as contributing to the growth of the city’s economy is a longer airport runway. On page 40 of the Long Term Plan it states:

*“Wellington’s economic prosperity depends on the strength of its connections with the rest of the world. The lack of long-distance direct air connections reduces the region’s ability to attract tourists, international students, support business growth and make business connections.*

*We are working with Wellington International Airport Ltd (WIAL) on this project. The total cost of the runway extension is expected to be about \$300 million. It is anticipated that funding will be drawn from those that benefit – the Airport, residents, and businesses across the wider region, and the Government in light of potential economic benefits to New Zealand.*

*We have budgeted \$90 million as our contribution towards a longer runway. Spreading this investment over 40 years would result in an annual cost of around \$6.5 million commencing in 2019/20. The Council will make a final decision on this project and whether to commit funding to construction in a future long-term plan, once WIAL has obtained resource consent for the project and the Council has received and considered a cost-benefit analysis and business case from WIAL that will be independently reviewed.”*

## 2.5 MARKET DEMAND FOR LONG HAUL TRAVEL FROM WELLINGTON AIRPORT

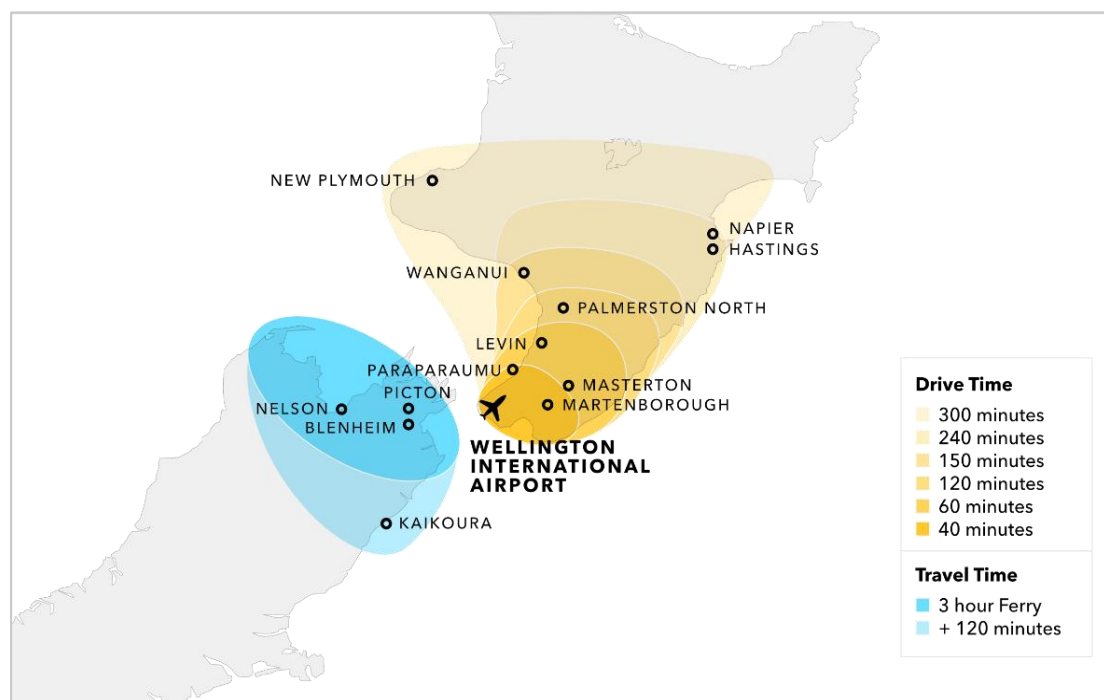
### 2.5.1 Determining the Wellington Demand

InterVISTAS, an international expert in airline route development, has been engaged by WIAL to assess whether current and future market demand will provide profitable and strategic routes for airlines from Wellington Airport. Refer to the **Technical Report 2**.

The assessment identifies that current demand for the long haul Wellington market consists of three distinct sources:

- 1) **Current Wellington Airport Traffic** – Passengers currently using Wellington and connecting via Auckland, Christchurch and Australia.
- 2) **Market Leakage** – Demand to/from areas where Wellington is the closest airport, but passengers are currently using other airports due to absence of long haul services at Wellington.
- 3) **Regional Connectivity** – Demand from other regions in New Zealand that could access a Wellington long haul service by making flight connections at Wellington.

Utilising various data sources<sup>23</sup>, InterVISTAS has estimated that the long haul market demand from the immediate Wellington catchment area in 2014 was 420 passengers per day each way (or 307,000 passengers annually). The largest markets are the United States and the United Kingdom with market sizes of 94 passengers per day each way (or 68,300 annual passengers) and 65 passengers per day each way (or 47,500 annual passengers), respectively, for travel to/from Wellington Airport. In addition to drawing air passenger traffic from the immediate Wellington area, the Airport has the potential to attract passenger traffic from the entire central New Zealand area, as shown in **Figure 2-3** below:



**Figure 2-3: Potential Passenger Catchment.**

The vast majority of travel would be drawn from the Wellington and Manawatu-Wanganui regions, each within a 2.5 hour drive from the Airport. These areas generate approximately 70% of the catchment's long haul demand. The total catchment market

<sup>23</sup> Sabre Airport Data Intelligence (ADI), Diio Mi and Statistics New Zealand international resident departure data.

size is predicted to be around 621.5 passengers per day. Although the “total catchment” area figures are representative of the full potential of the market, InterVISTAS has used a more conservative approach in the route forecasting, meaning that the market sizes have been limited to the demand that is currently using Wellington Airport (i.e. 420 passengers per day).

## 2.5.2 Connectivity Potential and Market Growth

Wellington’s location at the southern tip of the North Island provides it with a geographical advantage over other cities in New Zealand to facilitate domestic connections between the two islands and to provide international service with sufficient passenger numbers, especially from the South Island. The city’s population and the population of the surrounding potential catchment area (ie. Wellington catchment area (refer **Figure 2-3** above) as well as the South Island) create a sizeable base for new long haul flights and additional domestic flights to support them.

**Table 2-2: Proportion of NZ Resident Travel to Australian Destinations via Wellington**

New Zealand Region	Proportion of current WLG Tasman Traffic	Proportion of Regional Market
Auckland	0.8%	0.3%
Bay of Plenty	0.5%	1.5%
Canterbury	0.9%	1.1%
Gisborne	0.2%	5.4%
Hawke’s Bay	2.2%	16.6%
Manawatu – Wanganui	12.2%	58.1%
Marlborough	1.1%	22.6%
Nelson	0.8%	16.9%
Northland	0.1%	0.5%
Otago	1.4%	5.4%
Southland	0.6%	7.8%
Taranaki	1.3%	12.1%
Tasman	0.7%	15.1%
Waikato	0.4%	0.8%
Wellington	75.2%	89.7%
West Coast	0.1%	4.7%
Not Applicable/Not Stated / Not Captured	1.6%	16.4%
Grand Total	100.0 %	16.5%

The current international flights that operate to and from Wellington Airport to Australian destinations, carry traffic from outside the immediate Wellington area (refer **Table 2-2**). As shown in the table above, around a quarter of New Zealand residents

travelling on Wellington – Tasman services are from outside the Wellington area. These services have also demonstrated that Wellington services can serve a large portion of the total New Zealand market (currently capturing around 16.5% of New Zealand resident travel to international destinations served from Wellington Airport). Almost all Wellington region traffic (90%) flies directly out of Wellington, while 58% of the Manawatu-Wanganui Tasman market flies out of Wellington, predominantly accessing the airport by driving. Wellington Airport also captures 12-17% of the central New Zealand market (drive and air access) and 15-22% of the upper South Island (predominately air access).

The current runway limitations for long haul international flights require many potential passengers to connect via Auckland and/or closer international gateways (i.e. Australia). Most notably, travellers from the South Island, while physically closer to Wellington than Auckland, opt to bypass Wellington and go directly to Auckland for long haul flights. However, if Wellington could operate such long haul services, it could play a bigger role in New Zealand's links with foreign nations.

In addition to this current demand, InterVISTAS considers it necessary to also consider the future market growth, given that any potential long haul service at Wellington would not be operative for some time. The average growth rate for Wellington long haul passenger traffic is predicted to be 3% per year.

### 2.5.3 Review of Current Wellington Long Haul Air Service Options

As noted above, in terms of current options for Wellington long haul travel, the vast majority of traffic is routed via Auckland, Christchurch or Australia. In addition to the increased travel time and higher fares associated with connections via Auckland and Australia, limited capacity on these routes often restricts the actual available space<sup>24</sup>. As a result, the observed levels of long haul demand for Wellington are likely constrained.

### 2.5.4 Assessment of Potential Airlines and Routes

To identify potential long haul routes for Wellington, a number of variables were considered. The first is the route and growth strategies of airlines and whether New Zealand is already served by that airline. A review of the market size and the connecting market demand, the primary alliance affiliation of the country, as well as other strategic considerations, were used to identify and assess viable long haul routes for Wellington Airport. InterVISTAS then identified the top five likely routes for Wellington and undertook detailed modelling on their commercial viability (on a hypothetical basis):

- Singapore Airlines to Singapore
- Cathay Pacific to Hong Kong
- United Airlines to Los Angeles
- Emirates to Dubai (via Melbourne)
- Malaysia Airlines to Kuala Lumpur

<sup>24</sup> Meaning that the flight quickly reaches its passenger capacity and/or is potentially too expensive at the preferred flight time.

Four of the routes are forecast to achieve positive segment profit margins on an annual basis, while the Wellington to Los Angeles segment is likely to be profitable on a seasonal basis (during the northern winter season). Thus, by the time the runway extension could be operational, there are likely to be a number of viable long haul opportunities for the Wellington market, with the best potentially supporting a daily service to east Asia, as well as the possibility of a direct service to the west USA.

In addition, it is also recognised that Chinese markets and airline carriers hold potential for future direct services into Wellington due to China's significant growth in demand, airline capacity and networks.

### 2.5.5 Factoring Market Stimulation

It is widely accepted in the airline industry that market stimulation occurs following the offer of new services. This is based on retrospective analysis of new route launches and the impact these have had on traffic levels. When a new service is added it provides more travel options, lower prices and increased market visibility. This drives demand from passengers that would not have travelled before, deciding to do so due to the improvement in air access.

Stimulation not only occurs in the local market, but also in connecting markets where travel times and/or airfares are improved, making the served destination more accessible.

New services by foreign carriers generally result in a higher level of new visitors, as foreign carriers have a stronger market presence in their home country. Recent examples of new services by foreign carriers into New Zealand indicate that the visitor component of the incremental traffic is around 75%. This higher proportion of visitors will be beneficial for the New Zealand tourism industry and economy as a whole.

### 2.5.6 Forecasting Wellington Airport's Growth

WIAL engaged InterVISTAS to produce airport activity forecasts for Wellington Airport over the years 2015 to 2060. This report is attached as **Technical Report 3**. This work consisted of two components:

- Part A – Business as Usual (**BAU**) Airport Traffic Forecast consisting of both passenger and aircraft movement forecasts under a scenario where the Airport's runway infrastructure remains unchanged (i.e. no runway extension);
- Part B – Forecast of a Runway Extension Scenario consisting of both passenger and aircraft movement forecast under a scenario where the Airport's runway length is extended allowing the operation of larger aircraft types to further destinations.

Each scenario presented three options for growth under a high, medium (referred to herein as the **Most Likely** scenario) and low scenario to reflect potential variances in the underlying economic assumptions making up the forecasts. A summary of the Most Likely forecast results is provided below.



### 2.5.7 Most Likely Forecast Results

Under the BAU scenario (i.e. without the runway extension) forecast domestic air traffic at Wellington Airport is set to grow by an average of 2.1% per annum over the forecast period (to 2060). Domestic passenger growth in the BAU scenario is projected to accelerate over the period 2015-2020 as new domestic trunk and regional capacity is added and Air New Zealand adds additional ATR72 services on trunk and regional routes. Along with the introduction of Jetstar Regional Service to Dunedin and Nelson in 2016. This additional capacity is expected to stimulate demand, either by meeting underserved demand for domestic air travel or indirectly through pricing. In the longer term, domestic traffic is expected to grow as the New Zealand economy grows, although the rate of growth is projected to attenuate as the market matures. By 2035, domestic air passenger traffic is forecast to reach approximately 7.7 million passengers, and by 2060 reach just below 12 million passengers.

International passenger numbers at Wellington Airport under the BAU scenario are forecast to grow at a much faster rate than domestic passenger numbers despite the operational limitations placed on carriers by the runway's current length. Growth is forecast to be 3.2% per annum overall from 2015 – 2060, and to reach 3.1 million passengers in 45 years' time. International air passengers are forecast to grow to 1.7 million passengers in 2035 and to 3.1 million passengers in 2060.

Total passenger numbers under the BAU at Wellington Airport is forecast to grow at an average annual growth rate of 2.3% per annum, reaching 15.1 million passengers in 2060. The long term forecast growth of total air passenger traffic at Wellington Airport is forecast to be slightly less than the 2.5% per annum average growth rate previously observed between 1997 – 2015, owing to the eventual maturing of Wellington's air passenger market, combined with the runway length constraints.

Total aircraft movements under the BAU scenario are forecast to grow from 93,032 in 2015 to 149,800 movements in 2060, at an average rate of 1.1% per annum. Due to increasing average aircraft size through fleet up-gauging and higher load factors, aircraft movements are forecast to grow at significantly slower rates than passenger volumes.

Comparatively, under the runway extension scenario, domestic passenger numbers are forecast to grow at an average annual rate of 2.0% per annum, reaching 11.5 million by the end of the forecast period (2060). The long term growth and forecast for domestic passenger levels under the runway extension scenario is 0.1% less than the BAU scenario because a small proportion of international passengers will no longer need to connect via Auckland or Christchurch to reach international destinations.

International passenger numbers under the runway extension scenario are expected to grow at 3.8% over the forecast period, reaching 4.3 million in 2060. International passenger numbers are forecast to see its highest growth in the 10 years following the proposed runway extension, growing at 7.6% per annum from 2020-2025 and 4.7% per annum from 2025 -2030. As Wellington's new international market begins to mature, growth rates of international traffic will gradually attenuate towards the long term average.



Total traffic under the runway extension scenario is forecast to grow to 15.8 million passengers by 2060, at an average annual rate of 2.4%.

Under the runway extension scenario total aircraft movements are forecast to reach 155,700 movements in 2060, growing at an average annual rate of 1.1%.

Under the runway extension scenario, Wellington international passenger traffic is forecast to increase considerably compared to the BAU forecast. Comparing the Most Likely forecasts of the two different scenarios (runway extension vs BAU), the runway extension forecasts an additional 1.1 million international passengers will be travelling through Wellington.

## 2.6 DETERMINING THE ECONOMIC BENEFITS

Sapere Research Group (**Sapere**) was commissioned to undertake a cost benefit analysis (**CBA**) (attached as **Technical Report 4**) to determine the likely economic impact as a result of the Project. Sapere concluded that the proposed runway extension will improve the economic efficiency and increase access by individuals and businesses to affordable airline services at Wellington Airport by:

- Allowing “wide-bodied” aircraft, including long-haul code E sized aircraft, movements (not currently possible due to the runway length), resulting in greater passenger and freight loads and lower cost per passenger or kg of freight.
- Reducing the (financial and opportunity) cost of supplying and accessing airline services, particularly “long-haul” services to Asia and the USA that currently involve additional link flights either domestically (e.g. Auckland or Christchurch) or internationally (e.g. Sydney, Melbourne or Brisbane).
- Lowering barriers to increased competition for airline services at Wellington Airport, thereby further increasing the efficiency with which airline services are supplied (e.g. by allowing more efficient carriers operating more efficient wide-bodied aircraft to offer more competitively priced airline services at Wellington Airport).
- Increasing the number of aircraft and passengers using Wellington Airport (e.g. international visitors to New Zealand and New Zealand residents using the airport to travel overseas) and altering patterns of use of airline services at Wellington Airport.

The CBA report estimates the net benefit to the nation of the proposed runway extension, using a “gross” approach. A gross approach estimates the:

- Total additional economic costs that airports, airlines and providers of services to visitors would incur under each of the alternative options – that is, the additional real value of the nation’s resources that would be used under each of the alternative options.
- Total additional economic benefits that airports, airlines, users of airline services and all other sections of the community would derive under each of those

alternative options – that is, the additional real value of output supplied under each of those alternative options.

The total additional economic costs are subtracted from the total additional economic benefits to estimate the net economic benefit of the proposed runway extension relative to the 'business as usual' case.

**Table 2-3** below summarises these benefits and costs to stakeholders.

Achieving these efficiency gains would support a range of national and regional objectives as outlined in sections 2.4.1 to 2.4.4 above, including:

- The economic development and strategic plans and aspirations of local authorities throughout Wellington and surrounding regions.
- Tourism 2025 framework targets around connectivity, in particular enhancing sustainable air connectivity and improving the distribution of tourism throughout New Zealand.
- Achieving the aims of International Air Transport Policy, especially in relation to continuing the process of air services liberalisation and enhanced competition in the provision of international air services.
- National Infrastructure Plan 2015 ambitions around integrated infrastructure and supporting a strong economy through international connectedness.
- Meeting the goals of the Leadership Statement for International Education to double the value of international education to the New Zealand economy through developing and sustaining mutually beneficial relationships in key markets (many of which overlap with likely direct services possible following the runway extension).

The table below summarises the quantitative benefits and costs along with other qualitative factors:

**Table 2-3: Summary of Benefits and Costs to Stakeholders**

Group	Description	Benefits	Costs
<b>Users</b>	Outbound New Zealand passengers and senders of airfreight	<ul style="list-style-type: none"> <li>• Reduced travel times</li> <li>• Lower fares and charges</li> <li>• Greater frequency of services</li> </ul>	<ul style="list-style-type: none"> <li>• Costs (fares and freight rates) to use the additional air services available as a result of runway extension</li> </ul>
<b>Airlines</b>	Suppliers of new and existing air services to Wellington	<ul style="list-style-type: none"> <li>• Fewer link services needed</li> <li>• Reduced aircraft maintenance costs</li> </ul>	<ul style="list-style-type: none"> <li>• Nil (assumed to accrue to foreign operators)</li> </ul>

Group	Description	Benefits	Costs
<b>Airports</b>	Providers of airport services, separated into WIAL and 'others'	<ul style="list-style-type: none"> <li>Value of additional services provided to airlines and passengers</li> <li>Economic value of the runway and gate assets at the end of the study period</li> <li>Reduced costs to 'other' airports of supplying services that would now fly directly to Wellington</li> </ul>	<ul style="list-style-type: none"> <li>Cost of providing additional services to airlines and passengers</li> <li>Construction costs of runway extension and required gates</li> <li>Lost revenue from flights and passengers now flying direct to Wellington</li> </ul>
<b>Other sections of the community</b>	The wider population, including businesses, individuals, groups and government	<ul style="list-style-type: none"> <li>Incremental spending by visitors</li> <li>Additional GST paid by visitors on purchases</li> </ul>	<ul style="list-style-type: none"> <li>Costs of producing additional goods and services sold to visitors</li> <li>Efficiency costs of raising revenue through tax system to fund the runway extension, or alternative option</li> </ul>

The CBA concludes that the real economic benefit of the runway should substantially exceed its estimated cost (on the basis of current EMBIE draft guidelines for estimating costs). Extending the runway would produce a net economic benefit for the nation of around \$2.3 billion in today's dollars. Around \$8 of economic benefit would be added for each dollar spent on lengthening the runway. The analysis of how the net benefits would be distributed among stakeholders (including airports, airlines, users, and other sectors of the community) found that under the proposed runway extension scenario, the main beneficiaries are the users of air services and the wider community. A summary of the costs and benefits are presented as **Table 2-4** below:

**Table 2-4: Summary CBA results (\$m, most likely scenario)**

	Option 1	Option 2	Option 3
<b>Total benefits</b>	\$4,114	\$1,801	\$3,382
<b>Total costs</b>	\$1,790	\$827	\$1,790
<b>Net benefits (NPV)</b>	\$2,324	\$947	\$1,592
<b>Benefit-cost ratio (BCR)</b>	2.3	2.2	1.9
<b>Ratio of net benefits to capital costs (NBIR)</b>	7.6	5.4	5.2

The CBA necessarily focuses on national level costs and benefits. However, it is also reasonable to expect that the Wellington region will gain significantly from the proposed runway extension. Wellington is currently one of five ‘gateway’ cities in New Zealand; a gateway city is the first place a tourist visits but is not necessarily the sole or principal destination for the tourist. It is estimated that the proportion of tourist expenditure in the gateway city is around 31%. Hence, the Wellington region might expect almost a third of the net benefits of the additional visitor expenditure and this would equate to between \$570 million and \$1.9 billion.

Further, there are a number of *potential* economic effects not quantified in the CBA that are important in considering the overall economic benefit of the project. These include:

- *Increased competition for airline services to Wellington* – the increase in competitive rivalry from long-haul services into Wellington could be expected to substantially reduce price premiums paid by passengers due to limited connecting services to Wellington.
- *Business and migrant attraction* as a result of direct air links. The overall effect would be positive, and on some scenarios, could be significant.
- *Regional attraction of international students* – direct air links would make the Wellington region more attractive to international students. The overall effect at a national level would be modest, but from a regional perspective there would be beneficial upside.
- *“Democratisation of air travel”* with a greater proportional change in the propensity to fly for those on lower incomes. The overall effect is likely to be welfare enhancing, so possible minor upside.
- *Wellington as an option to divert* – the incidence of actual diversion would be very low; there is an existing alternative airport to divert to, meaning actual benefits relate to avoided processing delays which are marginal. The overall effect would likely be a minor beneficial upside.
- *Delayed infrastructure investment and regional redistribution* – by distributing passengers throughout the country, investment in infrastructure to cope with congestion could be deferred. The overall effect would likely be positive, but minor.

The CBA used the “most likely” passenger numbers and aircraft movement forecasts prepared by InterVISTAS as discussed above, but also assessed the impact on the CBA should the lower or higher forecasts eventuate.

## 2.7 PROPOSED RUNWAY EXTENSION

Recognising the latent demand and likely benefits of removing the existing barriers to growth imposed by the existing runway length established in the previous sections, WIAL considers that a viable case to extend the runway at Wellington Airport exists. This is further supported by the January 2016 announcement by Singapore Airlines to introduce services via Canberra to their hub airport Changi and beyond, as well as

discussions<sup>25</sup> WIAL has had with other new entrant<sup>26</sup> airlines but are prevented from establishing either long haul or Trans-Tasman operations due to the operational limitations imposed by the current runway length.

Noting that to extend the runway at Wellington Airport would necessarily require reclamation into either Lyall Bay or Evans Bay to the north and south respectively, WIAL has also undertaken a detailed analysis of known aircraft and potential route characteristics to determine the optimal runway length. Undertaken by Astral Aviation Consultants (**Astral**), this analysis (refer to **Technical Report 1**) has concluded that extending the runway to a minimum TORA of 2300m would enable Wellington Airport to handle most Code E aircraft types, in particular those smaller types more suited to meet the Wellington market demand, with a viable load capacity to and from Asian and American destinations. The proposed runway extension would also enable all Code E aircraft to operate on 'fifth freedom' long haul routes through Australia and onto New Zealand and then return.

Accordingly, in 2013 WIAL commenced detailed planning for extending the runway, with the first stage being the identification of a viable engineering solution for the proposed runway extension.

A number of options have been considered, including extending the runway north into Evans Bay, south into Lyall Bay or a combination of the two. Extending south into Lyall Bay was determined to be the most feasible engineering option. An assessment of alternative options considered is included in Chapter 5 of this report. Chapter 4 contains a detailed description of the Project.

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<sup>25</sup> These discussions remain commercially sensitive.

<sup>26</sup> To the Wellington market.

### 3. DESCRIPTION OF THE EXISTING ENVIRONMENT

#### 3.1 INTRODUCTION

The purpose of this section of the report is to provide a description of the receiving environment and context in which Wellington Airport currently exists and operates. This includes a description of the Lyall Bay coastal environment and CMA, and the land use activities undertaken in the area. It also identifies the existing road network which has been identified as a potential haul route for material to enable the construction of the proposed runway extension. Information from a number of sources, principally the technical assessments that form part of this application (refer Volume 3), were used to form the basis for this summary.

#### 3.2 GENERAL OVERVIEW

The existing 110ha WIAL site is an operating international airport as shown in **Figure 2-1**.

The Airport is essentially bounded by Lyall Bay to the west and south and Evans Bay to the north of the runway. Located on the adjacent site to the east of the Airport area, and within the Airport and Golf Course Recreation Precinct is the 31.2ha Miramar Golf Course. It was established on the Miramar Peninsula in 1908 and has been a constant in the surrounding landscape.

The Airport and Golf Course Recreation Precinct is surrounded by the residential suburbs of Miramar, Rongotai, and Strathmore Park. Rongotai is located on predominately flat land to the west of the Golf Course Recreation Precinct, while the suburbs of Strathmore and Miramar are located both on flat land and the hills to the east and north east. A more detailed description of these surrounding areas is undertaken later in this Chapter of the report.

The Airport Retail Park is located within the Airport and Golf Course Recreation Precinct, with further commercial and light industrial activity to the north west (Rongotai) and north east (Miramar) of the Golf Course Recreation Precinct.

#### 3.3 LYALL BAY COASTAL ENVIRONMENT AND SURROUNDS

Lyall Bay is part of Wellington's south coast. The 25km of south coast is characterised by steep ridges and escarpments running down to a narrow rocky shore platform, largely originating from the uplift as a result of the 1855 earthquake and previous large tectonic events. The steep coastal ridges and topography mostly run north-south and are dissected by streams. In places there are small sandy bays. Lyall Bay is somewhat untypical and it is the largest bay on the south coast, separating the Miramar Peninsula from the rest of the south coast.

The climate and weather also have a strong influence on the south coast, especially on the vegetation; and while parts of Lyall Bay are relatively sheltered, the climate and exposure is a major factor that has shaped and continues to shape the environment.



The headlands at the outer ends of Lyall Bay have not been developed for residential or other purposes. Although the headlands are protected as reserves the original native vegetation cover has long been removed and has been replaced by a mixture of young regenerating native species and exotic vegetation, with plant species adapted to the exposed prevailing environments. Throughout the whole of the Lyall Bay there is very little native vegetation, apart from the limited regeneration on the outer coastal headlands, virtually all of the other native vegetation has been planted using a very limited range of coastal species.

The natural beach building processes have been significantly modified by the construction of the Airport, the sea wall, road and residential, commercial and recreational developments. The extensive sand dunes of the Rongotai Isthmus that can be seen in the 1870 photograph (refer **Figure 3-1**) were extensively modified long before construction of the Airport started.



**Figure 3-1: 1870 Photograph of Lyall Bay.**

While the 'remnant' of Lyall Bay beach is relatively intact, the sea wall at the back of the beach cuts off the landward sand supply and inhibits any natural dune building process. Some minor 're-forming' of the dunes and revegetation has been carried out by WCC to re-establish, in small part, what would have once existed. The original foreshore vegetation species would have comprised a wider range of species than have been planted as part of coastal revegetation (pingao, spinifex, silver tussock). Onshore wind disperses sand from the beach and revegetated 'dune' area on to the adjacent road and environs. There are also four recreational and commercial buildings located in the middle section of the beach adjoining the sea wall (surf clubs, café, art gallery, and toilets and changing rooms).

There are historic associations in parts of Lyall Bay; Rangitatau Historic Reserve on Palmer Head was named from the Ngai Tara Pa that once occupied the headland and it has been acknowledged as the best surviving pa and archaeological site in the Wellington urban area. The southern end of the current Airport covers a rocky reef that was known as Moa Point. The area was known for finds of Moa bones, some of which are in Te Papa Tongarewa and previously the old Dominion Museum. As described in **Technical Report 5** one of the strong drivers for the treatment of Wellington's sewage and the push for a long outfall were the important Maori cultural sites in this area including Rangitatau Pa, Hue te Taka Peninsular, Tarakena Bay, Poito Pa and the whole embayment of Lyall Bay.

Arthurs Nose on the western side of Lyall Bay was a former quarry, which through excavation of the cliff face has substantially widened this part of the shore platform. Earthworks for the Wellington Wastewater Treatment Plant, residential housing and roading on the hillsides and along the narrow coastal platform have further modified the landform and introduced a range of built elements of various scales into the Lyall Bay landscape and seascape.

The narrow coastal platform, largely the result of uplift, is now mostly occupied by the coastal road that extends around most of Wellington's south coast. Areas of reefs have also been modified by the construction of the airport and the coastal road. The existing rock revetment forming the armoured edge running along the edge of Moa Point Road and along the airport runway is a major modification of the coastline.

The coastal platform south east of the Airport is modified by the construction of the existing runway, the formation of Moa Point Road and the enclave of residential dwellings. The boundaries of the residential properties extend up the steep hill face behind, but the dwellings are clustered along the toe. There is a narrow shingle beach in the front of the houses and above this a 30-50m wide foreshore reserve which is well used by the local community. While there are small areas of naturally growing species on the coastal fringe (glasswort, ice plant and other turf field species) the foreshore has mainly been planted with a limited range of native coastal species (e.g. taupata, coastal flax, pohuehue).

The steep slopes behind the residential dwellings and on Palmer head and environs show few obvious signs of erosion and have been allowed to regenerate, with pest animal and plant control regularly carried out by WCC.

The coastal cliffs on the eastern and western sides of Lyall Bay are dominated by taupata shrubland and coastal flaxland and in a few sheltered gullies there is a low canopy of taupata and mahoe. The dry faces and hill slopes are dominated by grasses, such as silver tussock, with club sedge, gorse and boneseed. There are many adventive species present such as Japanese honeysuckle, Cape ivy, boneseed, broom, karo and spur valerian which have a propensity to colonise low stature coastal vegetation communities.

## 3.4 LYALL BAY COASTAL MARINE AREA

### 3.4.1 Geomorphic and Morphology

Lyall Bay is a semi-circular, open bay on the Wellington south coast between the rocky headlands of Te Raekaihu to the west and Hue te Taka (Moa Point) to the east that is exposed to southerly swell from the Cook Strait. Lyall Bay formed when a tombolo connected the Miramar Peninsula (to the east of the Airport) to the hills to the west of Kilbirnie after four uplift events in the past 7,000 years.

Māori history identifies the Miramar Peninsula as a separate island (Motu-Kairangi or Miramar Island) some 900 years ago, but the area has since been subject to tectonic uplift by two events in more recent geological time.

The construction of the Wellington Airport in 1953-59, particularly the reclamation (and further extension in the 1970s), has altered the geomorphology of the eastern part of Lyall Bay.

The original 1941 shoreline of Lyall Bay and the former rocky outcrop are indicated on the **Figure 3-2** below, along with other existing geomorphic features of the area:



**Figure 3-2:** Geomorphic features of Lyall Bay including the 1941 shoreline and rocky outcrop.

Locally, around the end of the existing runway and spur-groyne (breakwater), the seabed bathymetry is dominated by the submerged extension of the former rocky reef (that was reclaimed) and gravelly deposits, whereas most of Lyall Bay comprises surface sediments of fine sand (median size of 0.15 mm) or rocky platforms along the periphery of the outer bay. The area north of spur-groyne and to the west of the original runway reclamation, has accreted since the reclamations, forming a shoal that provides good-quality surfing waves in “The Corner”. The western side of inner Lyall Bay has an extensive naturally-occurring shoal, with diminished wave energy.

In terms of the geomorphic setting and associated hydrodynamic processes, the existing environment in the eastern side of Lyall Bay has been considerably modified by the existing reclamations. The historic placement of a seawall along the back of the Lyall Bay beach and associated carparks and road has also considerably modified the natural beach processes by permanently fixing the shoreline.

The morphology of Lyall Bay Beach is largely-shaped by sequences of southerly-wave events (especially in winter), resulting in temporary landward retreat of the shoreline, with the sediment removed forming an offshore bar. There tends to be a reversal of this process in summer. The cove on the east side of the runway (Moa Point beach) is sandy with a coarser surface veneer of pebbles, but the relatively-shallow beach sand cover is generally perched on an underlying rock platform.

### 3.4.2 Climate and Waves

Winds are dominated by either southerlies or northerlies, with a long term average wind speed of 27 km/hr based on the Airport wind-station record.

Southerlies can generate a substantial wind sea which is usually accompanied by swell from the long fetches to the south, whereas the local sea generated by northerlies is severely limited by the short fetch (although this may be coincident with a residual swell from the south).

The tide range for Wellington is relatively low compared with the rest of New Zealand, with an average range of just over 1m. Only around 11% of the water volume of Lyall Bay is exchanged on an average tide, indicating that the tidal currents are very weak (negligible) within the inner confines of Lyall Bay. Currents near the spur-groyne are typically less than 0.06–0.1 m/s with low to moderate winds, but currents exceeded 0.3 m/s during two southerly gales during field work undertaken by NIWA. Modelling shows wind-driven currents tend to flow down-wind along the shallower margins of the bay, and into the wind through the middle of the bay - although for strong southerlies a clockwise eddy develops in the northern section and an anti-clockwise eddy in the southern section joining to drive a flow to the westerly quarter from the spur-groyne area.

The wave climate of the south Wellington coastline and outer Lyall Bay is well described, given the long 15-year wave-buoy record off Baring Head and shorter deployments in outer Lyall Bay. The majority of waves are relatively low (<1m) and short period (3–7 seconds), while the more highly-publicised southerly wave events of over 5m are only episodic with significant wave heights exceeding 3m and 5m



occurring on average for a cumulative time period of 14 days and one day per year respectively.

Waves up to 4.7m were recorded with an 80 km/hr southerly gale during the NIWA mooring deployment in September/October 2014 off the south western end of the runway and up to 6.1m at the entrance to Lyall Bay.

High-resolution wave modelling of the existing wave environment shows that wave refraction, as the wave shoals in shallower water, and wave diffraction around the spur-groyne, produce a wide range of wave directions within the inner bay, whereas the approaching wave trains in the outer bay are tightly constrained within a few degrees of due south. The spur-groyne and associated submerged rock outcrop, acts as a hydraulic control on wave and sedimentation patterns in The Corner surf area to the west of the existing runway.

The Corner is considered a good, intermediate level, reasonably consistent, left hander which breaks on the sand banks that have built up along the western edge of the existing runway rock revetment. It can produce a quick tube section in optimum conditions, followed by a steep workable wall. Without the runway break wall, the Corner surf break would not exist in its current form (ie. wave breaking would be more similar to the rest of the bay).

There is another surf break to the south of the runway called 'Airport Rights'. Airport Rights is an exposed reef break off the southern end of the runway which only breaks in very large swell and is for expert level surfers only. When the wave does break, it is typically a short ride, which normally ends in a powerful close out.

The rest of the bay is made up of average beach breaks which can be good during certain conditions, but generally lack the consistency of The Corner. The breaks ranging from the Maranui end of the bay to the west, (close to The Corner), are very dependent on the variable sand banks within Lyall Bay, but are typically good for surfers of all levels.

### 3.4.3 Contaminants

Land use in the surrounding catchment is predominantly residential with light industry/commercial as well as the Airport. The bay receives stormwater from the wider Lyall Bay catchment including the area around Wellington Airport and from the Moa Point Wastewater Treatment Plant. Secondary treated ultra-violet disinfected wastewater from this plant is discharged through a 1.87 km pipe to an outfall diffuser just beyond the entrance to Lyall Bay.

Despite these potential contaminant sources, water quality is considered to be very good and chemical contaminants are not considered to have a significant effect on marine organisms in the region. Because of the dynamic environment and moderate to well sorted fine sand sediments with low levels of mud (2-5%) contaminants in the surficial sediments are quite low and uniformly distributed across the area.

### 3.4.4 Optical and Turbidity Properties

In order to describe the background environment in Lyall Bay with respect to the optical properties of the water column, a mooring was deployed in the middle of the entrance to the bay for five weeks in the spring of 2014.

This mooring and its sensors provided a time-series of optical conditions with samples taken on several occasions during deployment for calibration and grab samples for optical properties for calm-weather conditions. This snapshot showed that the waters were typical of clear water with a blue-green hue with more of browner colour during storm events due to sediment runoff. During the deployment reduced visibility (20-30m down to <1m) and euphotic depth (40-50m to <10m) corresponded to storm events. The euphotic depth is the depth to which there is sufficient light for net photosynthesis of aquatic benthic and planktonic plants. Although limited to a snap-shot in time this time-series provides a realistic range of conditions likely to be experienced in Lyall Bay.

Total suspended sediment (**TSS**) concentrations from water grab samples taken at the mooring site on several occasions (during calm conditions) varied from 0.46 to 2.9 mg/L, corresponding to an **NTU**<sup>1</sup> of 0.3 to 2.2 NTU and secchi disc depth 5 to 11.5m. During the mooring deployment, which provided hourly measurements across a range of conditions,  $K_d$ <sup>1</sup> varied from 0.09 to 0.61m<sup>-1</sup> (median 0.21 m<sup>-1</sup>), TSS<sup>1</sup> 0.17 to 37.47 mg/L (median 1.69 mg/L) and euphotic depth<sup>27</sup> 7.6 to 51.4m (median 21.8m). Because of the instrument requirement for safe operation of a small vessel near-shore the synoptic survey was carried out during calm, clear conditions. This survey showed TSS concentrations of 0.5 mg/L at the mooring increasing to about 1 mg/L inshore.

Equivalent TSS concentrations at hourly intervals were derived from the outer Lyall Bay five-week optics mooring during September to early October 2014. The deployment captured calm periods and several storm events (one event an 80 km/hr southerly), with corresponding reduction in visibility range and increase in TSS. TSS in the outer bay reached maximum concentrations of 16 mg/L at the top sensor (8-m depth) and just over 37 mg/L at the bottom sensor (16-m depth), with higher concentrations nearer the seabed from wave-stirred seabed sediments during swell. These higher background concentrations in the outer Bay only occur infrequently during strong southerly wind events, particularly when accompanied by swell (which interact with the seabed at much greater depths than short-period wind waves). However, for most of the time the TSS concentrations are low e.g., the median TSS over five weeks was only 1.7 mg/L (8-m depth) and 1.9 mg/L (16-m depth) and for one-third of the time (33-percentile), TSS was below 1 mg/L at both depths.

Within the inner bay, TSS levels are likely to be higher, due to more dynamic wave-stirring of the seabed and wave breaking (also depends on prior sequencing of storms with respect to “availability” of fine sediments on the seabed). There will also be the influence of turbid stormwater discharges following moderate to heavy rainfall, which could combine with a southerly-wind/swell event. No background TSS measurements during storm conditions with inner Lyall Bay are available (only during fair weather).

<sup>27</sup> NTU – Nephelometric Turbidity Units,  $K_d$  – measure of light attenuation with depth, TSS – total suspended solids, euphotic depth – the depth at which there is sufficient light for net plant growth.



### 3.4.5 Benthic Communities

Studies have found that due to the dynamic, exposed and highly mobile fine-sand dominated environment epifaunal communities (animals living on the surface) are very low in overall abundance and diversity. Shrimps (*Malacostraca*) tended to dominate samples at sites close to the southern end of the existing runway, and gastropods at other sites further out into the bay. The presence of gravels at sites near the end of the existing runway appeared to provide greater opportunities for attachment for some taxa.

The macro-infauna that live in the sediment were also not very abundant with densities half those typically encountered in similar environments in more sheltered harbours, due to the wave-exposed dynamic habitat. The low numbers will also be a consequence of low organic matter in the sediments as a result of low chemical and biological activity. The presence of large numbers of burrows belonging to ghost shrimps, especially in the inner half of Lyall Bay, suggest these animals may comprise the bulk of the macro-infaunal biomass and can burrow down to up to 65 cm.

The meiofauna community (animals retained on a 45µm mesh) was dominated by nematodes (commonly known as roundworms), then Kinorhynchs, a type of small marine worm, and tardigrades (microscopic animals often referred to as “water bears”). The abundance of Kinorhynchs and tardigrades is probably related to their ability to withstand strong currents and preference for fine, clean sediments. These taxa are commonly found in other non-polluted sites.

### 3.4.6 Reef Communities

Rocky reef habitats are found all along the exposed southern Wellington coast supporting a rich and diverse community of brown, red and green macroalgae which in turn support a rich reef community of a range of fauna including gastropods, paua, kina and rock lobsters. The communities found on the reefs off the southern end of the runway are typical of those found along Wellington’s southern coastline.

Large strap-like canopy-forming macro-algal species (eg. *Lessonia variegata* and *Macrocystis pyrifera*) were common in the sub-tidal parts of all transects, except the one directly off the end of the runway. Crusting and turfing red algae occurred intertidally along most transects except the one off the end of the runway. The transect off the end of the runway was dominated by fine-branched red algae.

Artificial substrates (eg. Akmons) in the inter-tidal and sub-tidal zones along the edge of the existing runway provide habitat for a range of species including green tubular “ulva” like algae and/or the red algae *Pyropia*. Broken rubble habitats (cobbles-gravel-sand) supported more red algae and bryozoans. Small patch reefs (<2m<sup>2</sup>) with macroalgae holdfasts of giant kelp (*Macrocystispyrifera*) were also observed in the centre of Lyall Bay at depths of 10-13m.

Sponges, bryozoans and ascidians were common in the subtidal zones along all reefs with sponges more common in the mid or lower parts of transects and ascidians very common on reefs off the breakwater. Over 40 other species were found on the reefs at low densities. Barnacles were the most common taxa intertidally along with periwinkles and limpets while sea-urchins occurred sub tidally. Paua and rock lobster

were uncommon. A range of invertebrate taxa were found on concrete structures in the intertidal zone including periwinkles, snails, limpets, chitons and barnacles. Barnacles and snails were more common on rougher surfaces and chitons on smooth surfaces.

During the first survey of reefs a “Bangiales” type filamentous algae and an undescribed red foliose macroalgae were found respectively on intertidal concrete substrate and subtidal rocks at the southern end of the runway. Subsequent additional surveys found no additional specimens of the filamentous Bangiales on boulders in the vicinity but more specimens were found at the extreme western end of Lyall Bay which genetic sequencing confirmed were the same as previous specimens found in the wider Wellington region. The subtidal foliose red algae was not found during additional searches along other parts of Wellington’s south coast but has been found on the Otago coastline.

### 3.4.7 Plankton

The phytoplankton community (microscopic algae in the water column) was dominated by diatoms then dinoflagellates. Cell concentrations from the single sampling were very low with highest number of taxa and cell numbers found inshore in the middle of Lyall Bay. All species found are harmless and cosmopolitan, as would be expected from a well-flushed open bay.

The abundance of zooplankton (microscopic animals occurring in the water column) was also highest in the inner and middle of Lyall Bay than around the edges. The community was dominated by copepods and was typical of inshore coastal waters.

### 3.4.8 Birds and Mammals

New Zealand supports the most diverse seabird assemblage on earth with 161 species recorded including 95 which breed in New Zealand. Compared with the large number of taxa that would use Cook Strait, a much reduced assemblage would use Lyall Bay. This group is likely to comprise blue penguin (*Eudyptula minor*) which breeds along the south coast, fluttering shearwater *Puffinus gavia*, gulls, terns, shags, reef *Egretta sacra*, white-faced herons (*E. novaehollandiae*) and variable oystercatchers *Haematopus unicolor*. Blue penguins are likely to breed nearby at Moa Point but it is unlikely that any species would nest along the wall at the end of the existing runway due to the highly modified and exposed environment which currently exists.

Diversity among mammals is similarly high with 54 taxa recorded in New Zealand (43% of worldwide), eight of which are “threatened”. Based on the Department of Conservation’s (DoC) cetacean sightings database killer whales (*Orcinus orca*) and common dolphin (*Delphinus delphis*) have been sighted in Lyall Bay and close to the southern end of the runway. Other species may occur close to the harbour entrance but there is no evidence that Lyall Bay is particularly important for marine mammals and use is likely to be sporadic and transitory.

### 3.4.9 Fish Populations

Lyall Bay has a moderately diverse fish community with 27 species of reef fish predicted to occur, none are nationally threatened. In order of increasing abundance

these 27 species include blue dot triple fin, common conger eel, Yaldwyns's triplefin, leather jacket, sea perch, rock cod, scaly head triplefin, scarlet wrasse, variable triplefin, spectacled triplefin, red moki, butterfly, red-banded perch, yellow-black triplefin, banded triplefin, blue moki, marble fish, blue-eyed triplefin, common triplefin, common roughy, tarakihi, blue cod, banded wrasse, oblique-swimming triplefin, butterfly perch, and spotty.

The most abundant species during dive surveys were spotties and banded wrasse which occurred on all transects and the number and type of species showed good agreement with the predicted distributions from models of distribution around the New Zealand coastline. Along with tarakihi and blue cod these species are common on reefs throughout Lyall Bay and the south coast.

Forty-four demersal species are predicted to occur in Lyall Bay but only 11 species are likely to be common. The 11 species likely to be commonly found in Lyall Bay are barracuda, blue cod, leatherjacket, lemon sole, red cod, spiny dogfish, spotty, silver warehou, tarakihi, common warehou, and witch. No species is confined to Lyall Bay and all species are ubiquitous throughout the region.

The wider coastal and Cook Strait area supports important and diverse commercial fisheries, but activity in Lyall Bay is likely to be limited to occasional set netting and potting at reefs at the entrance to the bay targeting butterfly and rock lobsters respectively. Recreational fishing occurs in Lyall Bay with angling from the shore most popular, particularly from the spur-groyne off the south western tip of the runway. Recreational and customary hand gathering of kina, paua, and lobsters from reefs in Lyall Bay also occurs.

### 3.5 WELLINGTON INTERNATIONAL AIRPORT

It is evident that the existing Airport infrastructure and activities contribute significantly to the current form of the existing environment. As described its original construction and subsequent reclamation activities has significantly altered the shape and form of Lyall Bay, and its past and ongoing operations have an influence on surrounding land use activities.

The existing 110ha WIAL site is an operating international airport. The Eastern Apron accommodates international and domestic passenger operations, including aircraft parking stands, terminal facilities and associated car parking. The Western Apron comprises hangars and administration buildings and also accommodates the Airport's General Aviation (GA) activities.

It has a single north-south orientated runway (Runways 16 and 34) which has a 45m wide central paved section, and 7.5m wide paved shoulders each side, providing a total paved width of 60m. Protection Areas, as described earlier, of 150m in length are at each end of the current runway.

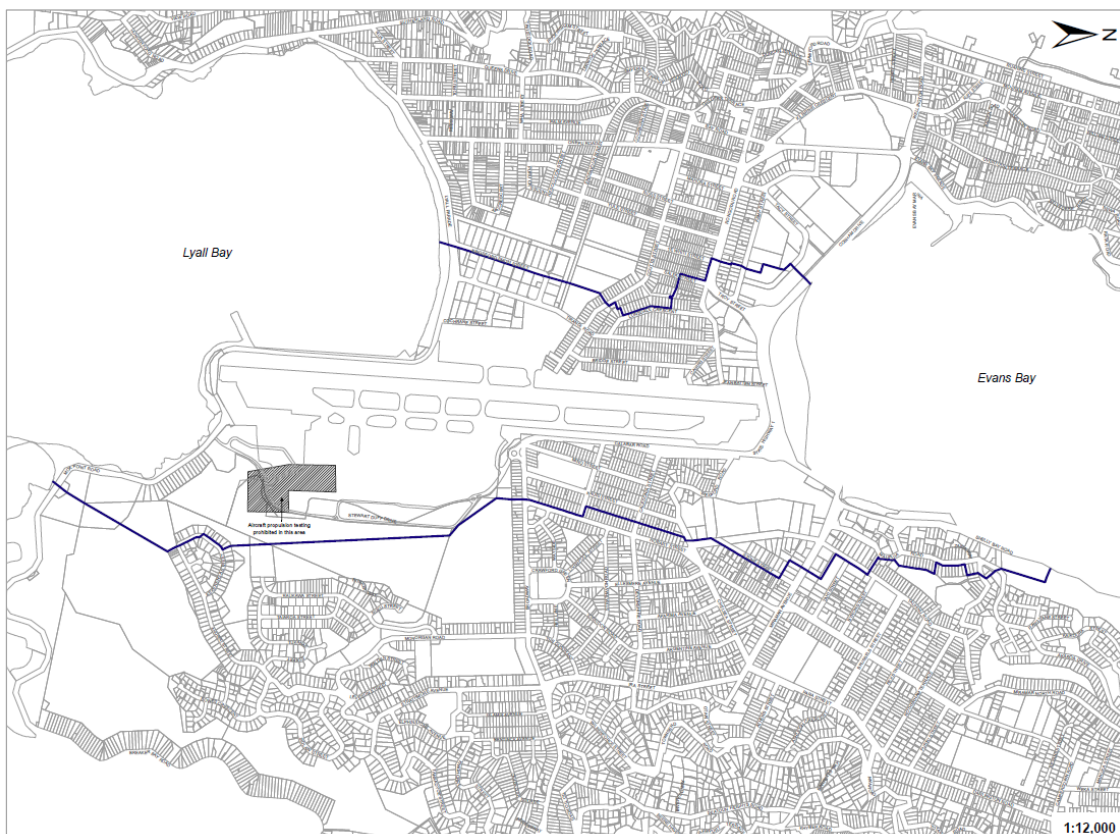
The Airport also features 11 stub taxiway links on the eastern side of the runway, providing access between the runway and parallel taxiway, and two taxiway links directly from the runway to the Western Apron. These provide all aircraft types with

numerous options for vacating the runway and help in achieving the relatively low runway occupancy times.

It is a mandatory CAA requirement to have in place an Obstacle Limitation Surface (**OLS**) in order to facilitate safe aircraft departures and arrivals. The Civil Aviation Rules specify the dimensions and requirements to maintain the OLS, and they are implemented through the Designation G.2 in the District Plan. In effect, the OLS establishes a height limit for structures and activities in and around the Airport area that must be adhered to, unless express permission has been obtained from WIAL following consent from CAA.

The Airport property also includes the Airport Retail Park which is located further west and accommodates large format retail tenancies contained in single-storey commercial buildings, and access and car parking.

Aircraft noise at Wellington Airport is controlled by rules in Chapter 11A of the District Plan. The Airport is required to ensure compliance with a 65 dB  $L_{dn}$  noise limit at the Air Noise Boundary (**ANB**) as shown on **Figure 3-3**:



**Figure 3-3: Wellington Airport Air Noise Boundary.**

In addition to the  $L_{dn}$  limit which includes a night weighting penalty for operations between 10pm and 7am, operations at Wellington Airport are further restricted by a partial night time curfew for schedule flights as follows:

- Domestic operations must not occur during the hours from 11.00pm to 6.00am for departures and midnight to 6.00am for arrivals.

- International operations must not occur during the hours of midnight to 6.00am for departures and 1.00am to 6.00am for arrivals.

Some exceptions apply that enable the operating hours to be extended in certain situations.

Noise from aircraft operations is monitored continuously by noise loggers at two locations near the ANB with a complaints process monitored by the Wellington Airport Air Noise Management Committee (including members of the community). Currently noise emissions are four to five decibels below the 65 dB  $L_{dn}$  limit.

Aircraft noise management at Wellington, and other New Zealand airports, is guided by New Zealand Standard NZS 6805:1992 *“Airport Noise Management and Land Use Planning”* (NZS 6805). NZS 6805 recommends residential activity and other noise sensitive activities should be prohibited inside the ANB. Wellington Airport has historically had a large number of residential houses in close proximity to the runway and within the ANB. As such residential activity is not prohibited within the ANB but new and altered noise sensitive activities are required to be acoustically insulated. The land use restrictions for activities sensitive to aircraft noise inside the ANB were recently strengthened through Plan Changes 72 and 73 following the outcome of the Land Use Management and Insulation for Airport Noise Study (**LUMINS**) (discussed below) which found that stronger controls were appropriate to curb residential intensification in this high noise environment. The changes which became operative in November 2014 include strengthening the acoustic insulation requirements for new and altered noise sensitive activities within the ANB.

The LUMINS Study was carried out by the Wellington Airport Air Noise Management Committee and was completed in 2009. The study involved an in-depth assessment of the effects of aircraft noise on residents. This led to consideration of mitigation options including:

- The purchase and removal of 22 dwellings from Bridge Street, which experience a very high level of airport noise that cannot be insulated against.
- A programme to develop a noise mitigation package and application for up to 700 dwellings and early childhood centres within the ANB.
- Stricter rules on the subdivision of properties within the ANB, and an improved standard for existing buildings.

Mitigation in the form of mechanical ventilation and/or sound insulation (depending on location and noise effect) in order to reduce aircraft noise exposure is being progressively offered to dwellings and early childhood centres within the ANB.

### 3.6 SURROUNDING LAND USES AND COMMUNITY FACILITIES

The following provides an overview of the key land uses and community facilities that currently exist within and surrounding the Airport. **Figure 3-4** indicates the location of the areas discussed further below.





**Figure 3-4: Suburbs Surrounding Wellington International Airport.**

### 3.6.1 Lyall Bay

Lyall Bay is the suburb situated on the south side of the Rongotai Isthmus. Lyall Bay beach is popular for recreational activities such as swimming, surfing and walking, and is home to two surf lifesaving clubs. There are a number of retail outlets (surf shops) and eateries situated along Lyall Bay Parade. The surrounding area is predominately residential with community facilities such as Lyall Bay Primary School and Lyall Bay Kindergarten. Dwellings situated along Queens Drive and Waitaha Cove have views of Lyall Bay and further east towards the Airport.



### 3.6.2 Kilbirnie

Kilbirnie sits on the eastern flank of the ridge which becomes Mount Victoria on the flat of the Rongotai Isthmus between Evans Bay to the north and Lyall Bay to the south. No clear boundaries separate Kilbirnie from neighbouring suburbs, with the exception of the town belt to the west which separates Kilbirnie from Newtown.

The suburb features a large shopping area, the Wellington Regional Aquatic Centre, the ASB Sports Centre, a recreation centre, a public library, Rita Angus Retirement Village and a sports field Kilbirnie Park. Kilbirnie hosts the only mosque in Wellington City. In addition, there is also a Hindu temple located in Kilbirnie, which serves as the headquarters for the Wellington Indian Association. Residential dwellings are predominantly single-storey dwellings. St Patrick's and St Katherine's Colleges are located in Kilbirnie, as well as a number of primary and intermediate schools, early childhood education centres and day cares. The suburb also has a few motels and apartment buildings. GO Wellington, the hub of the city's public bus and trolley network is also situated in Kilbirnie.

### 3.6.3 Rongotai

Rongotai is situated on the Rongotai Isthmus, between the Miramar Peninsula and the suburbs of Kilbirnie and Lyall Bay. Wellington Airport and its buildings, infrastructure, runways, and car parking occupies most of this area. To the west of the Airport a retail park exists comprising big box retail outlets such as the Warehouse, Bunnings, and Briscoes.

Rongotai College and residential activities are situated to the west of the Airport between it and Kilbirnie.

### 3.6.4 Miramar

Miramar is situated on the Miramar Peninsula, directly east of the isthmus of Rongotai and the Airport. The land use activities are predominately residential, with community support type activities including retail outlets (supermarkets, dairies), health facilities and eateries as well as recreational clubs and facilities. There are six primary schools and a number of early childhood centres located in Miramar including the Holy Cross School and Miramar Central School.

Miramar is also the centre of the Weta/Peter Jackson/Richard Taylor Movie Empire, with much of the former light industrial areas of the suburb now converted to movie making facilities.

### 3.6.5 Strathmore Park

Strathmore Park is located at the southern end of the Miramar Peninsula to the south of the suburb of Miramar, and east of the Airport. It is a hill suburb and overlooks Lyall Bay to the west, and several bays along the Seatoun coast close to the mouth of the Wellington Harbour which lies to the east.

Strathmore Park is a residential area, and also has several areas of reserves and recreational activities, including the Beacon Hill Reserve and Miramar Golf Course. Scots College is located in Strathmore Park. The southern end of the suburb is

dominated by Ataturk Park which contains a memorial to the lives lost in the Gallipoli Campaign of World War I.

### **3.6.6 Moa Point**

Moa Point consists of a headland, escarpment face and rocky outcrop reaching into the sea on the eastern side of Lyall Bay. The land uses include the Moa Point sewerage treatment plant and its associated large utilitarian structures on the lower slopes of the escarpment immediately to the east of the Airport. Moa Point includes a small enclave of residential houses immediately to the south east of the Airport at the toe of the Moa Point escarpment.

### **3.6.7 Houghton Bay**

Houghton Bay and Valley is predominantly a residential area, but also contains the southern part of Wellington's Southern Walkway, the Buckley Road Reserve, Houghton Valley School and the Southern Headlands Reserve.

## **3.7 RECREATIONAL ACTIVITIES**

### **3.7.1 Overview of Recreational Activities in and around Lyall Bay**

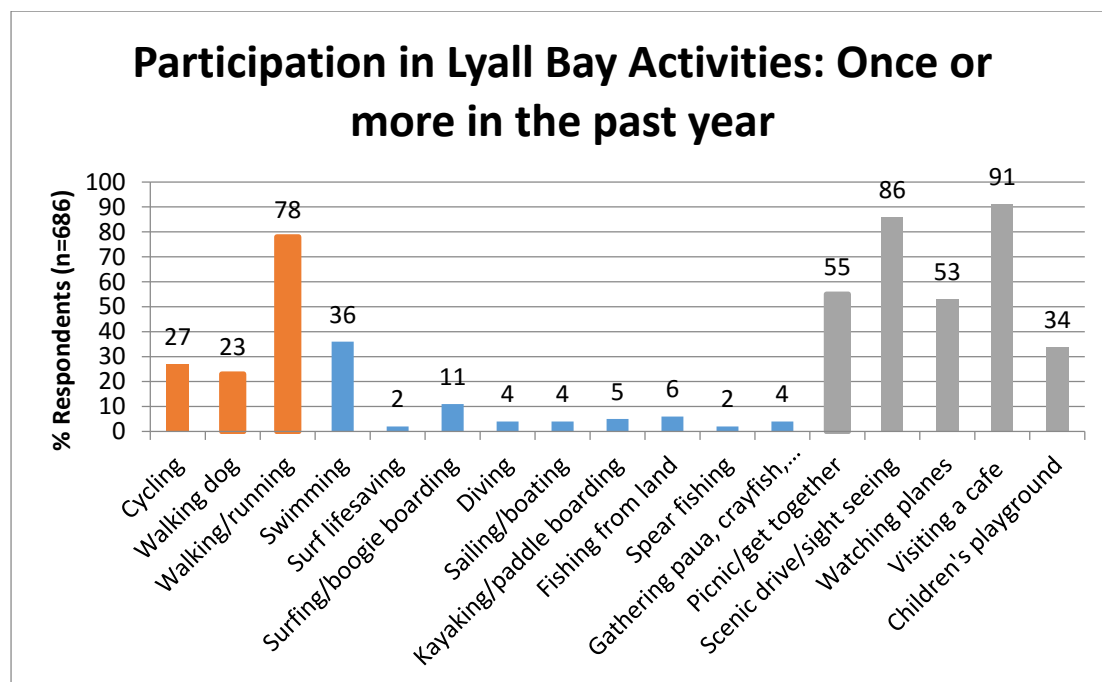
Lyall Bay is popular for walking dogs, surfing, kite surfing and wind surfing, surf lifesaving, swimming, fishing from land, scenic drives, picnics, visiting cafes, outings with families and watching planes. These general recreation areas are depicted in **Figure 3-5**, it should be noted however that these are indicative only and tend to merge and overlap with each other.



**Figure 3-5: Recreational Activities in and around Lyall Bay.**

An online Participation Survey conducted by TRC Tourism (TRC), indicated that 79% of respondents used Lyall Bay in the preceding 12 months for recreation or leisure (refer **Technical Report 6**). As shown in **Figure 3-6** walking, biking and running on or beside the beach, sightseeing and associated visits to cafes were recorded as the most popular activities. Water sports such as surfing, swimming and windsurfing,

represented a much smaller proportion of total recreational use in and around Lyall Bay.



**Figure 3-6: Survey Response Indicating Participation in Lyall Bay Activities.**

### 3.7.2 Sightseeing, Picnics, and General Leisure

The Participation Survey indicates Lyall Bay is used most for sightseeing, scenic drives and visiting cafes. Close to 50% of respondents use Lyall Bay for these activities either monthly or every few months.

The children's playground near the surf lifesaving clubrooms is often used in weekends and school holidays. This use is associated with visiting cafes, walking along the beach or sidewalk by families.

Lyall Bay is also popular for walking and running. Ten percent use the bay for walking and running on a weekly basis, 15% on a monthly basis and 27% every few months.

### 3.7.3 Walking Dogs

WCC conducted research in 2008 into dog walking/exercise areas in Wellington.<sup>28</sup> Lyall Bay was the most frequently used exercise area. The majority of survey respondents indicated that they drove to Lyall Bay, showing that it draws residents from a wider area.

The dog walking exercise areas are most frequently used in the afternoons, both on weekdays and weekends. Over half of the survey respondents mentioned they exercise their dogs more often in summer. Most respondents visit their 'usual' exercise area at least once a week.

<sup>28</sup> Absolutely Positively Wellington, Gavin Armstrong, *Dog Exercise Area Survey*, 2008.



### 3.7.4 Cycling

Cycling along the bays of the Wellington south coast is a very popular activity, especially in the weekends. Many cyclists and some pedestrians are known to ride or walk sections of the proposed Great Harbour Way, a 67km route from Pencarrow Head to Red Rocks. Part of this includes the roads and footpaths around the Airport. Nine percent of respondents in the Participation Survey use Lyall Bay for cycling every few months, 7% once or twice in the last year, 6% monthly, 5% weekly and 1% daily. Traffic Design Group (TDG) made observations in February 2015 along Moa Point Road with the following results shown in **Table 3-1**. Weekends are most popular for both cycling and walking.

**Table 3-1: Cycling and Pedestrian Use along Moa Point Road.**

Period	Cyclists per hour	Pedestrians per hour
Weekday AM peak	44	3
Weekday inter-peak	11	3
Weekday PM peak	19	4
Saturday AM peak	107	11
Saturday inter-peak	29	17

### 3.7.5 Plane Spotting

Plane spotting is a relatively popular activity in the Lyall Bay area. The most frequently used areas are the retail and food court inside the Airport terminal and the car park at Wexford Road.

The Participation Survey shows that 17% of respondents use Lyall Bay to watch planes every few months, 10% watch planes monthly followed by 16% once or twice in the last year, with 8% watching planes weekly and 2% daily.

### 3.7.6 Swimming and Diving

Swimming is a popular summer activity in Lyall Bay. It is generally a safe beach for swimming and is patrolled by lifeguards in summer. The Participation Survey shows that 19% of respondents used Lyall Bay for swimming once or twice in the last year, 9% every few months, 3% monthly and 3% weekly.

Lyall Bay is not often used for diving. It is understood that most Wellington divers use other places for this, such as the Taputeranga Marine Reserve (from Houghton Bay to Owhiro Bay). However, diving does occur between Moa Point and Hue-te-taha Peninsula and around to Tarakana Bay and is valued because it is one of the few accessible areas to the city where seafood can be gathered.

### 3.7.7 Fishing and Collection of Seafood

Fishing from land, spear fishing and collecting seafood (paua and crayfish) are known to occur along the road parallel to the runway, off the concrete breakwater and in the waters between Moa Point and Hue-te-taha Peninsula. Spear fishing also occurs between Moa Point and Hue-te-taha Peninsula.

### 3.7.8 Surfing

Lyall Bay is a popular location for surfing although there are no documented statistics available on the number of surfers who use Lyall Bay. The Wellington Boardriders Club has about 150 members, although it is not certain how many Lyall Bay surfers would be members of this club. Lyall Bay surf break is considered to be important by surfers living mostly in Wellington, Hutt and Porirua cities. It has very limited appeal nationally because of the inconsistency of surf, general lack of long, peeling rides and is well known amongst surfers for being very crowded in good or very good conditions.

The New Zealand Surfing Guide describes surfing at Lyall Bay as:

*The bay features a variety of peaks with constantly changing banks. The wall next to the airport offers the best quality. Expect a super sucky take off and quick tube. A workable wall will peel through to the inside and close-out. Spot gets insanely crowded.*<sup>29</sup>

On a good day, the Wellington Boardriders Club estimates there would be approximately 60 surfers closest to the rocks in The Corner break (nearest the Airport), 30 to 40 to the right of this and up 100 surfers scattering all over the bay.

Ideal conditions vary between surfers depending on their ability and tolerance for crowds. The sort of condition preferred by most surfers occurs about 20 to 30 times a year - clean, calm or light offshore winds from the north with a 1m to 3m swell with a 11 to 15 second period. Under these conditions, the corner break at Lyall Bay can be extremely crowded.

On a few days a year with large swells there is also a very small group of expert surfers that use the Airport Rights surf break which is within the same location as where the runway extension is proposed to be built.

### 3.7.9 Kayaking and Paddle Boarding

Lyall Bay is being used increasingly for paddle boarding. Ideal conditions for most paddle boarders include a clean calm sea (or light breeze from any direction) with a 1m to 2m swell.

Kayaking is not as popular as paddle boarding or surfing. White water kayakers tend to use the middle of the bay for practice and wave riding. The surf lifesaving clubs also make use of surf kayaks and paddle boards for their activities.

### 3.7.10 Surf Life Saving

#### **Maranui Surf Life Saving Club**

Maranui Surf Life Saving Club has about 850 members. Of these about 500 are active. They have a waiting list of people wanting to become a member. Members are from all over Wellington with approximately 70% aged under 14 years.

<sup>29</sup> New Zealand Surfing Guide, 2004.

The club uses the western end of the bay because it is the safest part of the beach and location of its clubrooms. Between October and April the club patrols the beach and undertakes training (four days a week plus every Sunday). Between May and September there is no patrolling, but there is life guard training (Sunday, Tuesday and sometimes Wednesdays). In February, the Maranui Surf Life Saving Club hosts competitions in Lyall Bay.

### ***Lyall Bay Surf Life Saving Club***

Lyall Bay Surf Life Saving Club has about 250-300 active members drawn from all over Wellington. About half of these members are aged under 14. The members aged under 14 are being trained on beach safety, the members aged over 14 are trained to patrol the beach.

In summer, beach patrolling at Lyall Bay is an important aspect for the Lyall Bay Surf Life Saving Club: in summer they patrol four days a week, from November onwards they patrol every day and from the end of December and January they are paid by the WCC to be the regional life guards. They do about 7-12 rescues every season, two or three searches and spend about 1 200-1 300 hours lifeguarding.

### **3.7.11 Kite Surfing**

Lyall Bay is used for kite surfing. Lyall Bay is suitable mainly for experienced kite surfers, with at least one year of kite surfing experience.

This activity occurs mostly at the western corner of the bay to the middle of the bay as far west as the buildings of the Airport Retail Park. Experienced kite surfers tend to use the whole bay starting and finishing in the western corner along from the surf lifesaving clubs.

### **3.7.12 Wind Surfing**

Lyall Bay is also used for wind surfing. It is understood that the Wellington Windsurfing Association has about 200 members, but only a small group uses Lyall Bay. Other areas being used are Plimmerton, Evans Bay, Seatoun and Eastbourne. Lyall Bay is the only spot in Wellington that offers good windsurfing on southerly and south - west winds. It is ideally suited to more experienced wind surfers due to cold, deep water and strong winds. Plimmerton and Pauatahanui Inlet are better locations for beginners and less experienced windsurfers.

The ideal conditions for most experienced windsurfers would be 25 knots or more and a south - west wind. Windsurfers use Lyall Bay between 80 and 180 days a year. On about three days a year Lyall Bay has massive swells ideally suited to expert windsurfers.



### 3.8 WIDER ROAD NETWORK

**Figure 1-4** identifies the location of Wellington Airport, the state highway and non state highway routes relevant for haulage of material to enable the construction of the proposed runway extension, and the key locations for sourcing fill materials.

Wellington Airport is well connected and serviced by the state highway network. In addition, and of relevance to the anticipated transport routes, WCC is responsible for the urban road networks that suitably link with the state highway routes within the proximity of the Airport.

State Highway 2 (**SH2**) Petone to Ngauranga supports 68,000 vehicles per day (**vpd**), including approximately 2,800 heavy vehicles. The weekday peak transport period occurs in the morning between 7:15am and 8:15am at a rate of around 6,000 vehicles per hour (**vph**). The weekday evening period occurs between 4:30pm and 5:30pm and involves around 7,000 vph. Traffic congestion can occur during these peaks, when travel times are also less reliable and often widely different on different days.

State Highway 1 (**SH1**) Ngauranga to Cobham Drive and Calabar Road follows the western side of Wellington Harbour and then traverses through Wellington city, around the Bain Reserve and then to Cobham Drive (via the Mt Victoria Tunnel), and terminates at the southern end of Calabar Road at Wellington Airport. It includes urban and motorway sections.

The following table confirms that typical weekday traffic volumes at different locations along SH1:

**Table 3-2: Typical Weekday Traffic Volumes along SH1.**

Location	Daily Traffic Volume	Daily Heavy Vehicle Volume
South of Ngauranga Interchange	87,000	3,000
Terrace Tunnel	45,000	1,400
Cobham Drive	35,000	1,000
Calabar Road	23,000	700

Similar to SH2, the peak traffic peaks occur at about 7:00am and 4:00pm on weekdays. Near the Basin Reserve, SH1 supports a large volume of commuter traffic travelling to and from the city and suburbs on the eastern side of Mt Victoria Tunnel and the Airport. It provides access to local schools (including Wellington East Girl's College, St Marks Church School, and Wellington College), and also Massey University. Further south, SH1 provides access to the Wellington Aquatic Centre, St Patricks College, Rongotai College, as well as many retail and business activities. Peaks in vehicle numbers therefore also occur during the drop off and pick up times for schools in the area (around 8:30am – 9:00am and 3:00pm).

## 4. DESCRIPTION OF THE PROPOSAL

### 4.1 DESIGN CRITERIA AND EXTENSION PARAMETERS

#### 4.1.1 Design Criteria of the Proposed Runway Extension

With reference to the Project Objectives outlined in Chapter 1 of this report, design criteria were developed to help inform the initial concept feasibility investigations and the design parameters of the proposed runway extension. These design criteria were developed initially by WIAL with assistance from Astral, who assessed the minimum aeronautical specifications for the runway, taxiway and protection areas to allow viable long haul travel. Subsequent input from project engineers AECOM, with reference to their international reclamation expertise, prescribed the minimum engineering performance requirements insofar as they relate to seismic and coastal (wave) activity.

**Table 4-1: Summary of Key Design Criteria.**

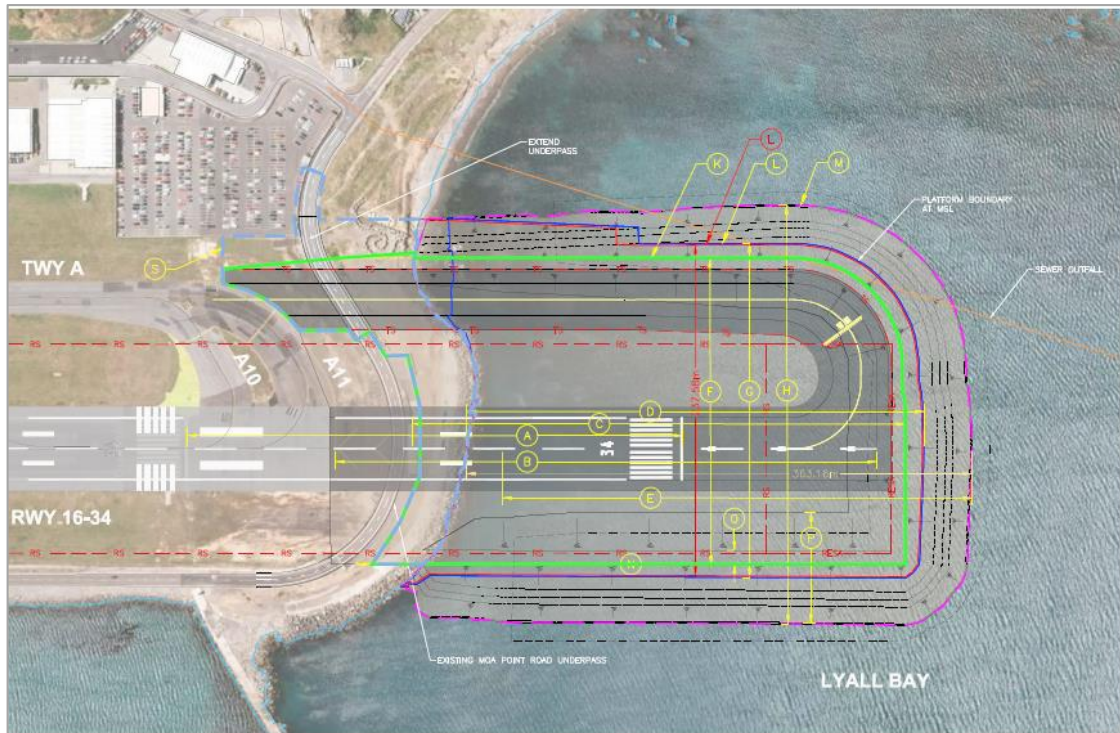
Key Design Parameter	Design Criteria
<b>Runway Specifications</b>	Minimum 2300m TORA Minimum 2150m Landing Distance Available
<b>Protection Area Specifications</b>	90m RESA 60m runway strip
<b>Aircraft Requirements</b>	Code E Aircraft Occasional passage of Code F Aircraft
<b>Taxiway Specifications</b>	107.5m from runway, centre-line to centre-line
<b>Seismic Performance</b>	500-year earthquake; 0.60g PGA; less than 2m lateral displacement and 1m vertical settlement 2,500-year earthquake; 0.98g PGA; no catastrophic failure
<b>Wave Height</b>	100-year wave; height 10% of waves ( $H_{1/10}=10.5\text{m}$ ; deep water significant wave height = 12.5m

Additional (though not Project defining) design criteria included maintaining the grade of the existing runway (+0.34%) for the length of the new runway extension (including the Protection Areas) and providing a geometry that would allow for a temporary taxiway connector to facilitate aircraft operations during construction periods when the runway may need to be temporarily shortened.

#### 4.1.2 Proposed Runway Extension Parameters

Based on the above design criteria and other influential feasibility and design parameters (refer to Chapter 5 and **Technical Report 7** for further detail on alternatives and options), an extension to the south of the existing runway configuration and the associated land reclamation was considered the preferred option. **Figure 4-1**

below shows the plan view of proposed runway extension (refer to **Technical Report 7** for a larger plan).



**Figure 4-1: Plan View of the Proposed Runway Extension. Refer to Table 4-2 for specific design parameters.**

The design parameters of the proposed runway extension, as shown in **Figure 4-1**, are described in **Table 4-2** below.

**Table 4-2: Design Parameters of the Proposed Runway Extension.**

Item	Project Parameter	Approximate Dimension or Quantity
<b>A</b>	Length of runway extension, from threshold to threshold	361m
<b>B</b>	Length of runway extension, from runway end to runway end	393m
<b>C</b>	Length of platform extension, at crest of platform	354m
<b>D</b>	Length of platform extension, at mean sea level (MSL)	331m
	Length of platform extension, at mean high water springs (MHWS)	331m
<b>E</b>	Length of platform extension, at toe of platform	337m

Item	Project Parameter	Approximate Dimension or Quantity
F	Width of platform, at crest of platform	220m
G	Width of platform, at MSL Width of platform, at MHWS	239m 238m
H	Width of platform, at toe of platform	301m
I	Height of platform, from toe to highest point	21.8m
J	Height of platform, from MSL to highest point Height of platform, from MHWS to highest point	9.0m 8.1m
K	Area of platform, at crest	8.3ha
L	Area of platform, at MSL Area of platform, at MHWS	8.1ha 8.1ha
M	Area of platform, at toe (within CMA)	10.82ha
N	Length of perimeter rock dyke, along wave wall	986m
O	Width of rock dyke at crest	10m
P	Width of rock dyke, from toe to toe at widest point	80m
Q	Volume of rock dyke materials (including armour layers)	583,600 m <sup>3</sup>
R	Volume of reclamation fill materials	857,380 m <sup>3</sup>
S	Area of platform above MHWS	1.7ha

### 4.1.3 Project Measurements

It is noted that there are a number of different measures used to describe the length of the proposed extension. This is a result of describing the extension from an aeronautical perspective (e.g TORA, runway threshold) versus a description of the physical extent of the runway extension. For the sake of clarity:

- The total length of the construction footprint (including both land above MHWS and the CMA) is approximately 391m and total area is approximately 12.52 ha;
- The total length of the extension (including the toe) from the existing land boundary into the CMA is approximately 363m and total area is approximately 10.82ha; and
- The additional TORA that is achieved by the extension is approximately 355m.

## 4.2 CONSTRUCTION CONSTRAINTS

The characteristics of the Project site, including its location directly adjacent to an operational airport and its exposure to strong northerly and southerly weather conditions present some unique construction challenges that will ultimately influence the construction methodology adopted for the Project. The following construction constraints with greatest bearing on this Project (and which have ultimately informed the construction methodology proposed for the runway extension) are described below, and include:

- Maintaining a fully operational airport throughout the duration of the construction period;
- Undertaking construction in adverse weather conditions; and
- The logistics associated with moving and placing large quantities of bulk material.

### 4.2.1 Maintaining a Fully Operational Airport

One of the mandatory requirements is that the Airport must remain operational throughout the construction of the Project. All construction activity will therefore have to be managed in such a manner that it does not impinge on the Airport's ability to meet its CAA requirements.

The Airport's designated OLS presents one of the most significant construction constraints for the Project<sup>30</sup>. In order to manage or mitigate the adverse effects on airside operations and approaching and departing aircraft, a combination of methods is proposed. This includes raising the height of the OLS and displacing the runway threshold (approach), raising the aircraft flight path (take-off) and eliminating the penetration (approach and take off) by controlling access of construction equipment and machinery under the OLS. The latter method may therefore necessitate that some elements of the proposed works will be required to occur outside of the Airport's core operational hours (between 10:00pm and 6:00am).

The feasibility of constructing the runway extension from an aircraft operational safety perspective has been assessed by Astral in consultation with the aircraft operators using Wellington Airport (refer to **Technical Report 8**). This assessment confirms that with appropriate measures in place as set out above, the construction of the runway extension is feasible from an aircraft operational and safety perspective.

### 4.2.2 The Weather and Sea Conditions in Lyall Bay

As described with respect to the existing environment, the Project is exposed to the open sea, which will result in construction impacts from waves, currents and wind. Sufficiently adverse weather conditions may even bring a halt to construction activities and will likely require the demobilisation of marine equipment from Lyall Bay to a safe refuge (such as Evans Bay). Provision for construction activities in less than ideal weather conditions will therefore need to form a consideration of the final construction methodology adopted.

<sup>30</sup> Figures 2a – 2c **Technical Report 8**.



Adverse weather conditions may also impact equipment positioning (via GPS), performance of surveying and quality control on material placement and quantity estimates. As such the contractor will need to phase construction with consideration for adverse sea conditions.

#### **4.2.3 Logistics Associated with Moving and Placing a Large Quantity of Bulk Material**

As noted in **Table 4-2**, significant volumes of bulk fill material is required to complete the runway extension. The source of this material and its associated transportation to the construction site has yet to be determined, however it will likely comprise a combination of marine and land based material and transportation means. With such large volumes, construction constraints arise from the rate at which the material can physically be transported to and processed on site. It is noted that for the purposes of the assessments that are discussed in Chapter 7 of this report, a worst case scenario has been assumed, that is all of the required fill material is required to be transported along the road network.

### **4.3 RUNWAY EXTENSION PROJECT OVERVIEW**

In order to provide a longer runway at Wellington Airport that achieves the design criteria set out in **Table 4-1**, a number of potential runway options were considered (refer to Chapter 5 for an assessment of alternatives). Following conceptual engineering design and associated costs, the construction of a runway platform over mostly reclaimed land into Lyall Bay was identified as the most feasible option from an engineering and cost perspective.

It is noted that the conceptual design that underpins the Project is based on a limited set of geotechnical investigations. More detailed geotechnical investigations will be required to be undertaken to determine the final detailed design. Further, it is possible that depending on the contractor, different methods, other than those outlined in the following sections, may be adopted, however based on AECOM's international reclamation experience, it is considered that any departure from the suggested methodology is likely to be relatively minor.

Following the development of the final detailed design, to construct the runway platform, it is anticipated that a full section rock dyke will be built around the perimeter of the runway extension. This rock dyke will be progressively armoured in layers of increasingly large rock and pre-cast concrete interlocking units (accropodes). It is noted that a series of ecological enhancement features are recommended to be incorporated into the design of the accropodes, as explained in further detail in Chapters 7 and 8.

Materials for the rock dyke (including its armour) will be sourced from existing quarries in the greater Wellington area – principally the Kiwi Point (Ngauranga Gorge) and Horokiwi (south of Petone) quarries located on SH1 and 2 respectively. Some of the larger rock rip rap may need to be sourced from large rock quarries in the Nelson/Golden Bay area as large sized rocks are scarce in the Wellington.



While the initial geotechnical information indicates ground conditions are very good, detailed investigations may reveal areas of weakness, which are proposed to be strengthened using a ground improvement method referred to as stone columns.

Once the rock dyke is in place, filling of the reclamation will commence. The indicative construction programme suggests that it may take around 18 – 36 months to complete the reclamation component on the Project (and depending on the source of fill). The reclamation fill is likely to be sourced from existing quarries in the greater Wellington area, or if available, made up of dredged sandy material won from the harbour channel.

Improvement of fill material may be required for reduction of both static and liquefaction (seismic)-induced settlements. The land platform will require extensive compacting and settlement, likely involving an extended period of surcharging by the placement of additional fill material to expedite its compaction and/or using ground improvement methods such as vibro-compaction. Once any surcharging is complete, the additional fill material would then be trimmed off the top, transported off site prior to the construction of the sealed runway and the installation of other associated runway infrastructure. The OLS will be an important consideration in terms of improvement methodology.

Noting the significant amount of fill material required for the construction of the reclamation, and that there is a possibility that all this material is sourced from Wellington quarries (with the exception of the larger armour rock which would need to be barged directly to the site) it is possible that all material will be conveyed to the construction site via land based transport methods, with routes centred principally on SH1 or 2. Barge options involving the transfer of fill from quarry to barge (via road trucks) then on to the site have been reviewed, and may be feasible, however whether such an option is selected will be dependent on the final contractor.

That said, any reclamation fill won from the Wellington Harbour channel – should the project by CentrePort gain consent and proceed – would be transferred direct from the dredge to the site.

Due to the constraints imposed by the OLS and the associated height restrictions for structures and machinery near the runway, it is anticipated that different methods used to build the rock dyke and fill the reclamation, such as marine based platform barges and land based diggers, may be required for different areas of the reclamation.

Associated works include removal of a hillock at the south western end of the Airport between Stewart Duff Drive and Freight Drive. It is likely that the material removed will be used as fill in the reclamation. Once this area has been levelled, it will be used initially as a construction staging area and then anticipated to be used in the long term for aircraft and car parking purposes.

The existing Moa Point Sewage Treatment Plant ocean outfall passes through the area of the proposed reclamation. An early phase of the Project will be to protect this outfall pipe to avoid damage due to placement of the dyke and reclamation fill.

At the outset the proposed runway works will involve the extension of the runway taxiway, requiring the extension of the Moa Point Road tunnel or the construction of a new bridge structure. It is anticipated that Moa Point Road will remain fully accessible to the public and also construction traffic throughout the proposed construction period, although with traffic management processes in place at times.

It is estimated that the construction works will require approximately 50 staff on the site at any one time to fulfil all of the daily construction tasks.

Upgrades to the airfield infrastructure, including grading, paving and utilities will be required in association with the Project, as well as changes to the ground lighting and navigational aid configuration. Subsequent upgrades to the taxiway markings will follow on the completion of the works.

In addition, a series of amenity improvements have been proposed and will need to be constructed. These improvements are detailed below.

#### **4.3.1 Surf Wave Focussing Structure**

Chapter 7 outlines the potential impacts of the Project on the surf conditions in Lyall Bay. To mitigate this potential impact, WIAL is seeking to install a surf wave focussing structure into Lyall Bay and designed to enhance the surf post-works, and if possible, leave the bay in a no-worse state than if the Project were not to occur.

This structure would be constructed in a similar manner to the rock dyke, with further details outlined in Section 4.5 below.

#### **4.3.2 Moa Point Road Improvements**

It is proposed that a series of roading, walking and cycling improvements be made to the western edge of that portion of Moa Point Road stretching from the eastern end of Lyall Parade to the western portal of the Moa Point Road underpass. Further details of these works are outlined in Section 4.6 below.

#### **4.3.3 Moa Point Beach Improvements**

At Moa Point Beach it is proposed to reinstate a beach form in the corner where the runway meets the curving beach. This will include enhanced ecological habitat for colonisation by marine life. A gateway landform in conjunction with the landscape treatment at the eastern part of the beach is also proposed, including the intersection of the Airport road and Moa Point Road. Further details of these works are outlined in Section 4.6 below.

### **4.4 CONSTRUCTION OF THE PROPOSED RUNWAY EXTENSION**

This section provides an overview of a feasible and realistic construction methodology for the Project, including construction sequencing, methods and the potential duration of various construction activities. As noted, the actual methodology adopted for the Project will not be finalised until the detailed design and engineering phase of the Project is complete and the construction contract awarded.

The following preliminary methodology has been developed based on the conceptual engineering design work completed to date, the associated geotechnical investigations and the Project objectives and constraints. It has also been based on the international land reclamation experience AECOM has with projects of a similar nature. While some departure from the construction methodology described in the following sections may be required following the detailed design and awarding of the construction contract, the magnitude of these departures will not likely be significant and the overall effect will be similar, regardless of the detailed method. If there is a significant deviation it is accepted that a variation or additional consents may need to be obtained.

A detailed description of the construction programme and methodology can be found in the Appendix L of **Technical Report 7**. It is summarised in the following sections.

#### **4.4.1 Pre-Construction Considerations**

##### **4.4.1.1 Construction Management Plans**

A construction management plan will be implemented for the duration of the project to manage the potential environmental effects arising during construction. Compiled during the pre-construction phase of the Project, the construction management plan will contain the general principles and approach for managing environmental effects, with the management of specific construction effects set out in accompanying management plans. Specific management plans to be developed in association with the Construction Management Plan include:

- Erosion and Sediment Control Plan (**ESCP**);
- Construction Traffic Management Plan (**CTMP**);
- Construction Air Quality Management Plan (**CAQMP**);
- Construction Noise and Vibration Management Plan (**CNVMP**);
- Ecological Mitigation and Management Plan (**EMMP**);
- Network Utilities Management Plan (**NUMP**);
- Surf Mitigation Adaptive Management Plan (**SMAMP**).

Further description of the detail and intent of these management plans is contained in Chapter 8. Some of these management plans have also been developed in draft form and are attached to this report (refer **Appendix D – G**). This is described further in Chapter 8.

##### **4.4.1.2 Establishment of Construction Plant and Equipment**

A combination of marine and land based construction plant and equipment will be required to construct the Project. This is anticipated to include (but is not limited to):

**Table 4-3: Marine Based and Land Based Construction Plant and Equipment.**

Marine Based Construction and Plant	Land Based Construction Plant and Equipment
<ul style="list-style-type: none"> <li>• Jack up barge;</li> <li>• Standard barge;</li> <li>• Hopper barge;</li> <li>• Long Arm Digger (mounted on a barge);</li> <li>• Trailing Suction Hopper Dredge;</li> <li>• Clam Shell Dredge;</li> <li>• Cutter Suction Dredge;</li> <li>• Spilt Hull barge;</li> <li>• Floating and Land Based Discharge points;</li> <li>• Ancillary/support plant such as deck barges, tender tugs and crew boats; and,</li> <li>• Survey vessels (for quality control and inspection, quantity calculation for payment, and identification of fill problems).</li> </ul>	<ul style="list-style-type: none"> <li>• Tipper Truck and Trailer Units;</li> <li>• Long Arm Excavators;</li> <li>• Stone Column rigs;</li> <li>• 15 to 50 tonne excavators;</li> <li>• Bulldozers – e.g. D6, D8 and D9;</li> <li>• Medium Wheel Loader e.g. CAT 980;</li> <li>• 150 to 400 tonne crawler cranes;</li> <li>• 25 ton articulated dump trucks;</li> <li>• Compressors (including compressed air tools); and,</li> <li>• Rollers.</li> </ul>

#### 4.4.1.3 Source Construction Material

A substantial volume of general construction and fill materials will be required to undertake the proposed works, in the order of 1.5 million m<sup>3</sup>. Establishing security of rock and accropode supply, as well as the associated load and transportation routes will be required throughout the duration of the Project. The potential sources of the aforementioned construction fill material that have been identified include:

##### Land Based Bulk Fill Material Sources:

- Horokiwi Quarry, Lower Hutt.
- Kiwi Point Quarry, Ngauranga.
- Belmont Quarry, Lower Hutt (discounted due to distance to site, but remains a possible option).
- The small hillock shown on **Drawing G1.0** within **Technical Assessment 7** within the Airport.

##### Offshore Fill Material Sources:

- Dredged from marine sources, specifically the Wellington Harbour Navigation Channel.

Sources of gravel and rock materials for stone columns and rock dyke:

- Smaller sized rocks and stones – quarries within of the Wellington region.

- Large-sized rocks – likely to be sourced from the Nelson area. Other options include Collingwood, Taihape, Linton and Taranaki. Rock from Collingwood and the Nelson area would be transported by sea, whilst rocks from the other sources would most likely come by road (possibly being trucked to a barge loading site then delivered to the site via marine transport).

It is likely that rock from a number of sources using land-based and marine-based methods of delivery will be used to meet the volume requirements.

## 4.4.2 Construction Establishment

### 4.4.2.1 Construction Offices and Compounds

Four potential construction office and compound facilities have been identified for the project. Primarily located to the east of the existing runway, the sites include<sup>31</sup>:

- The area created by flattening a small hillock that lies between Stewart Duff Drive and Freight Drive (Hillock Area);
- The existing long term carpark accessed from Freight Drive; and
- The two areas of vacant airport land at Kingsford Smith Street / Tirangi Road to the west of the Airport (the Kingsford Street Compounds).

The sites to the west of the airport will likely be used as site offices housing personnel, whilst the remaining sites will be used for both site offices and construction compounds. All sites are located nearby and will be connected to utility networks, including potable water, sewer and stormwater. Electrical, telecommunications and fibre optic cables are also available nearby.

Site offices and compounds will be secured and access provided via designated and secure access points. Security lighting will also be provided and will be akin to the lighting of the existing long term car park off Freight Drive.

### 4.4.2.2 Site Access and Haulage Routes

As noted above construction and fill material will likely be conveyed to the site via a combination of land-based and marine-based transportation equipment.

#### ***Marine Based Transportation***

Barges and hopper dredges may be used to transport material such as fill and rocks to the construction site. While it is assumed that the prefabricated coastal defence units (such as the accropodes and wave wall components) will be delivered to the site by road and batched on site, it may be that these components are constructed off site, and barged direct to the site.

Marine-based transportation methods will necessitate the installation of new mooring systems. While piers, trestles and/or floating docks have been considered, based on the information to hand, a series of mooring buoys that would allow marine equipment

<sup>31</sup> Refer to the site plan for the locations of these compounds.

to securely anchor are proposed to be installed. Further details of the proposed mooring systems are provided in Section 4.4.2.3 below.

The construction of any stone columns for the rock dyke will most likely be from a marine based jack-up rig or equivalent. The installation of the remaining materials that make up the rock dyke can be undertaken using either land-based or marine-based construction equipment.

Transportation of land sourced materials via water based means is likely to include a fleet of bottom dump barges (or similar) that will import the reclamation fill from a transfer facility (port) following its delivery from the quarry. The barges would operate on a revolving basis until such time that they can no longer float over the rock.

Marine-based transportation methods are anticipated to generate approximately six deliveries by barge per day (12 two way movements). There would be additional boat movements from support vessels, which are estimated to be four movements in any one day.

Marine sourced material (for example from Wellington Harbour) would be delivered direct to the site via pumping systems contained within dredge vessels.

Operating times of the marine based plant will vary depending on the works being done and the weather and sea state conditions.

Land based plant is likely to operate for a longer period due to fewer constraints compared to marine-based activities. A likely worst case estimate is around 75% for land based plant.

### ***Land-Based Transportation***

As outlined in Section 4.4.1.3 above, land-based sources for fill material will also be utilised, and also particularly during adverse weather and sea conditions. In terms of haulage routes to the construction site, it is proposed to use a combination of separate daytime and night time routes, with corresponding different numbers of traffic movements.

As shown in **Figures 1-2 and 1-3** in Chapter 1 a day time and night time haulage route is proposed.

The daytime route (**Figure 1-2**) has been designed to work within the existing traffic conditions at existing intersections along the route and includes a separate inbound and outbound route. The inbound route leaves Cobham Drive (SH1) and Calabar Road before entering the airport precinct along Stewart Duff Drive before entering the construction site. The outbound route leaves the work site along Moa Point Road before continuing along Lyall Parade, before turning on Onepu Road and Evans Bay Road before re-joining SH1. This daytime route has the ability to accommodate up to 30 trucks per hour between the hours of 9:30am and 2:30pm, resulting in a maximum of 150 trucks per day.



The night time route (**Figure 1-3**) uses the same haul route from Cobham Drive (SH1) before entering the Airport precinct via Calabar Road, i.e. an identical route to the daytime inbound route. The night time movements are noise constrained and the assessment has concluded that a maximum of 160 trucks would be acceptable on a staggered basis between 10:00pm and 6:00am.

Both routes use a common route from the quarries through the city centre before continuing along SH1 towards the Airport as shown in **Figure 1-4**.

As described in **Technical Report 9** and in Chapters 7 and 8 a CTMP will detail the measures related to the timing of vehicle movement, cleanliness of vehicles, keeping public roads available and minimising risks to the safety of vehicular and pedestrian movements.

#### 4.4.2.3 Mooring Establishment

One of the key elements for the Project will be the impact of weather and ocean conditions on the construction activities. Adverse weather conditions could potentially halt construction activities and will likely require demobilisation of the marine equipment from Lyall Bay to a more sheltered area. However, allowances will need to be made for performing construction activities during less than ideal weather conditions. Therefore provision will need to be made so that marine equipment can be maintained on site. As such, mooring system concepts were developed for the marine construction equipment anticipated for the Project in support of the proposed construction activities, as well as to minimise demobilisation of marine equipment from Lyall Bay. This equipment includes barges, tugs and other floating equipment necessary for dredging and placement of dredged sediment, importation of construction materials by sea routes, construction of the rock dyke and installation of stone columns.

The potential mooring concepts that could be implemented for the Project include:

- Self-mooring;
- Mooring buoys and mooring trestle;
- Mooring buoys, floating dock, fixed pier and wave barrier; and
- Mooring buoys, mooring trestle, fixed pier, and wave barrier.

Full details of the potential mooring systems options can be found in Appendix M of the Concept Feasibility Report attached as **Technical Report 7**.

The exact type and location of mooring systems required for the Project will depend upon the contractor's proposed construction approach and the marine construction equipment. As such aside from temporary mooring buoys as shown on **Figure 1-6**, no consents for alternative mooring system options are being applied for at this time.

The proposed mooring buoys will be installed in the general vicinity of the work areas to provide temporary mooring for staging equipment. These moorings are proposed to be anchored using either "deadman" type anchor blocks or Danfoss-type anchors, connected to heavy anchor chain connected to the mooring buoy. Approximately 100

to 200m of chain would be required from the anchor to the mooring to effectively engage the mooring buoy-based system in heavy seas.

#### **4.4.2.4 Network Utilities and Services**

Construction could potentially impact on a number of network utilities and services. Utilities and services will either be protected in place or relocated in conjunction with the Project's construction. Contractors will be required to work closely with the relevant service providers to undertake the necessary protection and/or relocation works.

A NUMP will detail the measures to ensure the integrity of the networks utilities and services is maintained throughout the duration of the Project.

##### ***Moa Point Sewer Outfall***

The existing Moa Point Sewage Treatment Plant ocean outfall passes through the area of the proposed reclamation. Protection of the existing Moa Point Sewer Outfall will likely be scheduled as early as possible in the Project to prevent delays to other operations.

The Moa Point Sewer Outfall will likely be bridged to protect it from the effects of construction. Possible options being considered for the protection of the sewer outfall include a bulkhead wall instead of the dyke toe extending out over the pipe; pile-supported steel cage or concrete platform over the pipe; and, if necessary performing ground improvements under the pipe (such as deep soil mixing or jet grouting).

While the final design will be arrived at in consultation with Veolia, Wellington Water and WCC the operators and owners of the pipeline, suggested protection options are outlined in Appendix N of **Technical Report 7**.

##### ***Roading Network***

As noted, as part of the early stages of the Project a new underpass or bridge structure to the east of the existing Moa Point Road underpass is proposed to be constructed to enable Moa Point Road to remain open during construction of the runway extension. Once constructed, traffic can be diverted into the new underpass and the existing reclamation extended southwards to enable construction vehicles to drive over the top of the new underpass (or bridge).

It has yet to be determined whether the new underpass or bridge will be connected to the existing underpass or whether it would remain a separate structure. Additional health and safety measures may be required if they are connected. This detail will not be known however until detailed design is complete. The final design will be arrived at in consultation with WCC, the road controlling authority for Moa Point Road.

#### **4.4.2.5 Construction Lighting**

Construction lighting will be required, particularly when undertaking night work. Land based lighting will be similar to that currently used in the long term carpark at Wellington Airport. Lighting will be directed downwards and the sideways dispersal confined.

Navigation and the required operational lighting will be provided for marine equipment.

### 4.4.3 Construction Programme

#### 4.4.3.1 Construction Sequencing

The general sequencing and duration for construction of the runway extension Project is set out in **Table 4-4**, and supported by **Figure 4-2**. The actual staging and duration will be finalised on completion of detailed design and from input of the construction contractor.

It should be noted that many of the stages identified below can and will be performed concurrently, with staggered starting dates. The overall construction timeframe is therefore anticipated to be in the order of three to four years, with the source of the bulk fill being an important factor in the duration of construction. This timeframe also takes into consideration the likely delays due to adverse weather conditions.

**Table 4-4: Indicative Construction Sequence.**

Stage	Duration	Description
<b>Stage 0</b>	3 months	General site establishment works, including site compounds, staging areas and temporary marine support and berthing/mooring structures.
<b>Stage A</b>	14 months	Installation of stone columns beneath the rock dyke, if required.
<b>Stage B</b>	14 months	Once stone columns are sufficiently advanced, commence installation of stone blanket over stone columns, adjacent filter layer on seabed and secondary armour layer over seabed filter layer. Trim all rock to final profile.
<b>Stage C</b>	14 months	Once stone blanket, seabed filter layer and secondary armour over seabed filter are sufficiently advanced, commence installation of core rock section of the rock dyke. Remove existing Akmon armour units in the immediate vicinity where land-based operations have commenced.
<b>Stage D</b>	14 months	Progressively place filter layer to outside of core batter and trim to profile. Trim top of core material to obtain filter profile to complete placement of filter material.
<b>Stage E</b>	15 months	Once the core section and filter layer are sufficiently advanced, place primary armour to toe; secondary armour over batter filter layer; followed by outer primary armour to batter. Progressively recover existing Akmon armour units to place on outside of new eastern rock dyke.
<b>Stage F</b>	13 months	Complete core and filter to top surface, and then complete placement of secondary armour and primary

Stage	Duration	Description
		armour top (horizontal) layers. Leave out accropods immediately adjacent to precast concrete wall location.
<b>Stage G</b>	1 month	Fabricate geotextile into large panels and roll onto mandrel. Fix geotextile to top of rock dyke and roll down the batter.
<b>Stage H</b>	5 months	Construct reclamation using locally dredged material with marine-based equipment and/or land-based (and possibly marine based) equipment for land-based fill material. For the marine-based method, establish pumping connections and locations for off-load of the dredged material from marine-based equipment, as well as flow discharge points from reclamation. Place fill material to finished surface level.
<b>Stage I</b>	3 months	Once reclamation is sufficiently complete, place precast concrete wave wall units (3-metre-long precast units ~30 tonnes each) using crawler crane. Place final (primary armour) accropodes in position adjacent to the precast structure. Place precast drain and graded gravel surface to top surface of precast units.
<b>Stage J</b>	1 month for wick drains, and if performed, 10 months for surcharge, including 8 months consolidation	Perform ground improvement (such as vibrocompaction) of reclamation fill materials. Alternatively, where applicable, install wick drains within area of reclamation to be surcharged then construct surcharge fill.
<b>Stage K</b>	10 months	If surcharge fill placed, remove surcharge. Construct airfield drainage, pavements, amenity improvements to Moa Point Road and Moa Point Beach, and install navigation lighting, etc.



**Figure 4-2: Pictorial Examples of Land Reclamation Activities – Representing Stages D, E, F, G and H described in Table 4-4.**



#### 4.4.3.2 Hours of Construction

Aside from the limitations on heavy vehicle movements to the construction site, construction of the proposed runway extension will operate on a continual basis in order to complete the Project as efficiently as possible (acknowledging that there will be period of down time due to constraints such as adverse weather conditions and Airport operations). Due to the constraints of the OLS and the need to maintain scheduled airside operations for the duration of the Project, night work will also be required between the hours of 10:00pm to 6:00am, particularly between 1:00am and 6:00am when the Airport is non-operational.

Night work will be required to perform parts, if not all, of the following construction activities:

- Construction of the extended underpass;
- Construction of temporary marine support and berthing/mooring structures;
- Protection and/or relocation of the outfall;
- Construction and implementation of the ground improvements under the rock dyke (if necessary);
- Construction of the rock dykes;
- Construction of the reclamation;
- Implementation of surcharge fill and/or ground improvement of the reclamation fills; and
- Construction of the airside works, including but not limited to pavement works, the installation of all lighting, electrical, drainage, pavement marking, navigational aids, fencing, topsoiling, grassing works and all finished ground level based associated tasks.

An assessment of night time work has been conservatively based on daytime working days of 10 hours, 6 days per week and accordingly the majority of night time work for these phases is estimated to occur over:

- Three calendar months for the extended underpass and temporary marine structures;
- Intermittent periods over 18 calendar months for construction of the rock dyke;
- Five to 18 calendar months for installing the reclamation fill depending on the sources of the fill materials;
- Two to three calendar months for ground improvement of the reclamation fills; and
- Ten calendar months for the airside works and removal of any surcharge on the reclamation fill.

These periods could be independent of each other or concurrent depending on the contractor's programme. To manage the effects of construction noise both during daytime and night time periods a CNVMP is proposed to be prepared and



implemented. This is discussed further in **Technical Report 10** and in Chapters 7 and 8.

#### 4.4.4 General Construction Activities

Noting the construction outline set out in the previous section, this section will further develop some of the specific anticipated methodologies associated with key aspects of the construction.

##### 4.4.4.1 Stone Column Construction

Initial geotechnical investigations indicate that ground improvement work will not be required to stabilise the reclamation fill and/or the existing marine deposits underlying the rock dyke. However if the further geotechnical investigations contemplated for the completion of the detailed engineering design identify that the preliminary data is not representative of the entire construction envelope, ground improvement works may be required. Vibro-replacement stone columns will be included in the construction methodology to ensure their potential effects are considered, should the need for their use arise.

Stone columns are installed by vibroprobes inserted into the ground, displacing and densifying the in-situ materials. The space created is then backfilled with coarse gravel compacted with the vibroprobes in multiple layers. Settlements are reduced by transferring applied vertical load to the stiff stone columns, and also by densification of the in-situ soils between the columns.

If ground improvement is required, stone columns would be installed generally in accordance with the following design approach in the liquefiable or settlement prone areas underneath the rock dyke:

- Soils would be replaced at a ratio ranging between 5 to 25%, with an assumed average of 15%.
- Stone columns of 0.8 to 1.2m diameter stone would be installed.
- Stone columns would be installed on a triangular array with a 2.4 to 3m centre to centre spacing.
- Stone columns installed from the sea floor to the bottom of the potentially liquefiable soils layers (likely ranging from 5 to 15m deep).

Any stone columns required under the rock dyke are likely to be installed using marine based plant and equipment. A stone blanket and filter layer will be installed over the stone columns (if required), followed by a secondary armouring over the seabed layer.

Machinery required for the construction of the stone columns is likely to penetrate the OLS, particularly close to the existing runway end. If so, this work will need to be coordinated with airside operations and will likely require some night time scheduling.

A detailed description of the stone column constructability is set out in Appendix O of **Technical Report 7**.

#### 4.4.4.2 Rock Dyke Construction

A rock dyke will be established around the full perimeter of the runway extension and will retain and protect the fill materials placed for the construction of the reclamation. The rock dyke will therefore be one of, if not the first components of the Project to be constructed, and would only be preceded by the installation of stone columns should they be required.

The construction of the rock dyke will be performed via marine-based and/or land-based plant and equipment. Installation of the core rock section of the rock dyke will commence with the placement of quarry fill trimmed to a triangular section, then overlain with filter stones. Secondary armouring, comprising of 1.6- to 3.1 tonne high-quality stone is then placed over the filter stones. Primary armouring units in the form of 24 to 34 tonne accropodes are then placed around the entire structure, with the larger accropodes located along the southern extent of the dyke where exposure to wind and waves is greatest. The construction of a concrete wave wall at the top of the structure completes the construction of the rock dyke. Refer to Appendix F of **Technical Report 7** for cross sections of the rock dyke. Because a significant number of the existing Akmon armour units and their underlying secondary rock armour (currently protecting the existing runway) would be covered by the new reclamation, it is anticipated that they could be removed, stored, and re-used on the shallower and more sheltered eastern side of the runway extension.

Construction plant and equipment associated with the construction of the eastern and western rock dyke is likely to penetrate the OLS. Similarly, the placement of the primary armouring units will likely require mobilisation of a barge mounted heavy lift rig that is also expected to penetrate the OLS. As such this work will need to be coordinated with airside operations and will likely require night work.

The rock dyke is a key structural element of the Project that allows the runway extension to meet the seismic and wave design criteria.

#### 4.4.4.3 Reclamation Bulk Fill Construction

Two methodologies for reclamation bulk fill are being considered for this project – land and sea based (using dredged material) reclamation, or a combination of the two methods.

If dredged material is used for the reclamation fill, the material will likely to be delivered to the site by barge. If barge delivered, the materials will need to be pumped into the reclamation. Pipe discharge into the reclamation can be achieved using floating and/or land-based discharge points. A marine based approach will allow the reclamation area to be filled from any direction along the rock dyke.

The filling operation for material delivered by road will likely occur across the east-west width of the reclamation and progress in a southerly direction, starting at the southern end of the existing land. The fill will most likely be firstly installed across the whole reclamation area up to a height of RL 1.5m above mean sea level (**MSL**) to enable performing ground improvement of the reclamation fills, if required. If ground improvement is not required for the reclamation fill, then the filling operation will continue.

The outlet weir(s) for the removal of water from the reclamation as the filling is progressed will most likely be at the north west or south west corners of the rock dyke, although the locations of the weirs will be subject to the water turbidity performance standards proposed in proffered condition 64 as detailed in Chapter 8 of this report.

Penetration of the OLS for this component of the work will be dependent on the height of the plant and equipment used. If the reclamation fill is to be brought to site via truck and trailer units, an assumption has been made that a 6m high working room (measured from the ground) is required for the tipping process. Based on a 6m working headroom, the level at which there is encroachment into the OLS occurs at RL 1.5m above MSL at the end of the existing reclamation and RL 8.3m above MSL at the southern end of the extended reclamation. Due to these limitations, it is expected that between 160,000m<sup>3</sup> and 230,000m<sup>3</sup> of fill activity will need to occur during the night time period. Further night works may also be required in response to adverse weather conditions or other unforeseen delays.

#### **4.4.4.4 Sediment and Erosion Control**

Sediment control measures adopted during construction will include a combination of containment and using materials that minimise the area of dispersal within the CMA. These will be designed to minimise the impact of on potential sediment plumes during the construction of ground improvement measures (if required), the stone blanket, rock dyke, and reclamation fill. These are described in the ESCP that will be prepared and implemented to manage any potential effects in this regard. This plan and the proposed measures to address potential turbidity effects are described in Chapters 7 and 8.

All material used for the construction of the stone blanket and rock dyke will meet the Ministry for the Environment definition for “cleanfill” and will be comprised of material greater in size than silt particles (sand size particles (0.2mm) and above).

A weir or decant system will likely be implemented within the rock dyke in combination with any additional measures proposed by the contractor to manage sediment control during the placement of reclamation fill.

As described in Chapters 7 and 8 a CAQMP will be prepared and implemented for the duration of the Project to appropriately manage dust and debris effects. Containment of debris will be required for the duration of project due to the strict operational requirements of the Airport and airside access restrictions.

#### **4.4.4.5 Reinstatement of Pavement Markings, Airfield Ground Lights and Navigational Aids**

Pavement works and markings, services, navigational aids and lighting, fencing, topsoiling and grassing will all be reinstated on the completion of the reclamation platform.

The changes to the runway configuration described in Section 6.1 will result in the following necessary modifications to the aeronautical ground lighting (**AGL**) systems and navigational aids (**NAVAIDS**):

### ***Aeronautical Ground Lighting***

- New taxiway centreline and edge lights;
- New runway guard lights at the intersection of the extended taxiway and the new runway end;
- New runway overrun and edge lights; and
- Reconfiguring runway lighting colour codes along the length of the runway.

### ***Navigational Aids***

- Relocating the existing runway localiser, localiser shelter, ground checkpoints, and associated power and communication infrastructure;
- New 'runway distance remaining' signs to delineate the new, longer, usable pavement;
- New threshold bar at the runway's new threshold location;
- Relocation of the existing Precision Approach Path Indicator (**PAPI**); and
- Relocation of the exiting glide slope antenna, shelter and associated power and communication infrastructure.

Standard construction plant such as excavators, tipping trucks, generators, compressed air tools are required to undertake this work (outside of Airport operational hours).

## **4.5 CONSTRUCTION OF THE SUBMERGED WAVE FOCUSING STRUCTURE**

As described in Chapter 7 of this report, the DHI Assessment which is attached as **Technical Assessment 11** has identified that the proposed runway extension will likely result in changes to the existing surf amenity within Lyall Bay, including to the surf break, "Airport Rights" which is within the proposed footprint of the reclamation area. Mitigation is proposed in the form of a submerged wave focussing structure (**SWFS**), located in the middle of Lyall Bay, approximately 400-450m from the shore. This structure would be designed to at least mitigate the effects of the runway extension by creating a left and right breaking wave which does not currently occur with any regularity.

A conceptual layout of how the structure will look is shown in Figure 8-4 and Figure 8-5 of **Technical Report 11**. The main feature of the structure is a curved shoaling platform designed to refract approaching waves towards the middle, focusing wave energy into a peak in the lee of the structure which will cause waves to break over the natural inshore bathymetry. The crest level of the structure is to be sufficiently deep so that waves only break on the crest during rare occasions of very large waves. The structure must be positioned a distance sufficiently west of The Corner to avoid any reduction in wave energy propagating into the existing surf break.

The approximate dimensions of the structure, which need to be confirmed through a more detailed design investigation are as follows:

**Table 4-5: Preliminary Design Specification SWFS.**

Specification	Value
Volume	17,000m <sup>3</sup>
Footprint	20,000m <sup>2</sup>
Crest Depth	-5.0m at <b>MHWS</b>
Length (at the longest axis)	180m
Width (at the widest axis)	140m
Toe Slope	1 in 30
Distance from shore to deepest point	450m

The most suitable material for construction the structure is rock, which has proven durability in the marine environment and has the ability to meet the design objectives. Rock has a long history in coastal defence structures and protection works throughout the world. It is a proven material for marine construction and provides excellent levels of durability. Numerous detached and submerged breakwaters have been constructed around the world for shoreline protection. The choice of construction material will result in some level of porosity of the structure, which will affect both structural stability and wave dissipation over the structure. In conventional rock armouring structures a high porosity can be desirable as it improves stability and limits the size requirements. However for the purposes of the wave focusing structure, it is recommended to limit porosity in order not to introduce too much wave energy dissipation over the structure, which would work against the intended purpose of the structure. Further detailed investigations coupled with scaled physical model tests are recommended in order to confirm appropriate sizes for the rock armouring layer.

In terms of placing the rock material, it is important that the machinery can be operated with a high degree of accuracy in order to assure that the construction layout meets the design specifications. One likely option is to use a jack-up barge mounted long-arm excavator to place the material.

## 4.6 CONSTRUCTION OF THE URBAN DESIGN FEATURES

The Project also includes urban design and landscape treatments. Provision will be made for a new shared (walking and cycling) path of 3m width along the west side of the straight section of Moa Point to a new lookout point at the existing breakwater. The new path will extend from the lookout point to the corner of Lyall Bay Parade.

The breakwater area will be reworked to provide the lookout area and associated amenities such as seating. The integrity of the breakwater will not be compromised given it retains a key role in protecting the western perimeter of the Airport.

At the Moa Point Beach it is proposed to reinstate a beach form in the corner where the runway meets the curving beach. This will include enhanced ecological habitat for colonisation by marine life. A gateway landform in conjunction with the landscape treatment at the eastern part of the beach will also be introduced, including at the

intersection of the Airport road and Moa Point Road. The gateway landscape incorporating directional signage will address the currently unresolved left over spaces at this point of transition from the Airport to the coastal edge.

The existing tunnel underpass that connects from the west to east side of the runway will be extended to the east with either a new separate bridging structure, or extension of the current tunnel. The space within the tunnel will be lit with brighter lights to improve the visibility of users to traffic and improve their experience.

It is acknowledged that the majority of these features will be on land which is owned by other parties, such as WCC. Consultation with the relevant asset and landowners has been undertaken, and a Memorandum of Understanding will be developed between all relevant parties.

#### **4.7 AIRCRAFT OPERATIONS FOLLOWING THE RUNWAY EXTENSION**

Following the runway extension, the landing threshold is proposed to be relocated approximately 360m south of the existing threshold. The start of aircraft roll position would also shift approximately 362m south of the current start of roll. This would alter the take-off position for all aircraft using the Runway 34 at Wellington Airport.

As indicated, the extended runway would enable larger aircraft to operate viable services. This includes aircraft such as Boeing 777-300ER, 787-800 and Airbus A350-900. The runway extension would also enable aircraft to operate on 'fifth freedom' long haul routes through Australia and onto New Zealand and then return.

These larger aircraft (likely to be 787-800 and A350-900) are most likely to operate on direct long haul routes from Wellington to Asia and North America. Due to the likely scheduling of these routes, it is unlikely that there will be night time operations (between the hours of 10:00pm and 6:00am) required at the Airport, however there is a possibility that aircraft from North America may land between 6:00am and 7:00am, unaffected by the present curfew requirements. There is sufficient capacity in the ANB to provide for these additional flights and no changes are proposed in this regard.

It is noted that the proposed runway extension will have a consequential effect on the existing OLS for the Airport. Amendments to these surfaces will be sought at a later date, once the extension construction has been initiated. It is envisaged that the new OLS will not affect any existing structures.



## 5. CONSIDERATION OF ALTERNATIVES

### 5.1 INTRODUCTION

This chapter provides a summary of the key aspects of the alternatives assessment process that was undertaken during the development of the Project.

From the outset of the Project, analyses were undertaken indicating that viable passenger loads justifying long haul currently exist but are prevented from commencing due to deficiencies in the existing runway length. Aviation consultants, Astral, undertook a study of runway options required for the viable operation of long haul flights from Wellington to east Asian and western North American destinations. This confirmed the minimum useable length of a runway extension to facilitate viable long haul flights, setting the initial design criteria for the Project.

Initially, WIAL had no fixed view on extending the runway either north into Evans Bay or south into Lyall Bay (or a combination of these two options). Technical advisors (AECOM) were engaged to determine the engineering viability and construction requirements for either alternative. It was then envisaged that an assessment of environmental effects of both options would be undertaken in order to compare the environmental impacts of each option relative to the other.

Part of the initial engineering feasibility assessment looked at the comparative costs of reclaiming land to extend the runway either north or south. Following this process, it became apparent that extending north would cost significantly more than a southern extension option (via reclamation). For this reason, it was considered that the northern option was no longer viable. Accordingly, the focus of the alternatives assessment turned to the engineering feasibility, construction methodologies and requirements, and assessment of environmental effects arising from of the proposed southern extension.

WIAL also engaged AIRBIZ to evaluate the potential for alternative airport sites within the Wellington region (**Technical Report 12**). This work built on an earlier study undertaken by Works Consultancy Services in 1992. This original study encompassed the establishment of selection criteria for feasible airport sites, a search for such sites within the Wellington region, and a high level economic evaluation of candidate locations. Seven sites were identified following review of the region's topography to find the preferred location. The conclusions of the 1992 study supported retention of Wellington Airport at its current location. The work undertaken by AIRBIZ in 2013 further confirmed that the current location of the Airport remains the most appropriate, due to its close links to the Wellington CBD, and the existing investment and infrastructure already established at the site.

## 5.2 ASSESSMENT OF ALTERNATIVE RUNWAY LENGTHS

### 5.2.1 Existing Airport Constraints

As described earlier in this report, Wellington Airport operates a single 1945m long runway, with 150m Protection Areas and essentially bounded by the CMA at each end. As described in Chapter 2 of this report, analysis of traveller demographics and forecasting has indicated that a viable case for long haul flights exists for Wellington Airport. In addition, WIAL is aware of new entrant airlines that wish to operate Trans-Tasman flights to Wellington utilising Code E aircraft (Boeing 777-300ER). In both instances, the current runway length inhibits the viability of these services.

### 5.2.2 Analysis of Aircraft Characteristics to Determine Runway Length

Following the identification that long haul flights to and from Wellington could be potentially viable, WIAL engaged consultants, Astral, to review the runway extension options required in order to enable viable long haul flights from Wellington to east Asian and western North American destinations (**Technical Report 1**).

In its preliminary work, Astral considered the viability of a number of runway extension length options to determine which would allow viable operations of long haul flights from Wellington to east Asian and western North American destinations. That earlier work looked at four incremental options from a 100m extension to a 400m extension, and assessed that long haul operations become increasingly more viable with extensions over 300m.

Based on this preliminary analysis, and following a review of the (then) known cost considerations, WIAL adopted a 355m useable length southern extension option, lengthening the runway from 1,945m to at least 2,300m TORA. Astral subsequently updated its preliminary analysis on this basis. This updated analysis also took the opportunity to add discussion regarding the feasibility and benefit of the extension for narrow body international jet operations operating Trans-Tasman and south west Pacific routes and also to include new data on a number of aircraft (787-9, A350, A330-800/900NEO, A320NEO and A321NEO) that was not available at the time of their preliminary work.

The Astral work is based on extensive information on aircraft performance provided by Airbus, Boeing (via their consultancy arm Jeppesen) and Lean Engineering, a US based aviation consultancy, and concludes and recommends:

- *The proposed 355m extension enables four of the nine candidate wide body aircraft to operate long haul routes from Wellington Airport to most east Asian destinations (including Bangkok, Bali, Guangzhou, Jakarta, Hong Kong, Manila, Shanghai, Singapore, Kuala Lumpur, Tokyo, Osaka and Seoul) with a full passenger load under the study take-off ambient conditions of 21°C, wet or dry runway with 5 knots of headwind.*
- *The United States West Coast can also be reached by four candidate aircraft, on the same basis.*

- *A lesser extension would not provide this capability in particular due to minimum control speed considerations on take-off and wet runway landing restrictions.*
- *The runway extension is particularly beneficial for wide body aircraft landing, the existing runway being very short for such aircraft especially under wet runway conditions.*
- *Narrow body aircraft, especially the A320 and A321 NEO, also benefit from a runway extension for operations to four longer range Trans-Tasman and Regional Pacific destinations. For the A320, flights to these destinations is not viable without the runway extension. The benefit for the 737-800 would be similar.*

Astral therefore recommended that the 355m extension (2,300m TORA) is the minimum viable for long haul operations of wide body aircraft at Wellington Airport. However, it is noted that even with the extension, runway grooving<sup>32</sup> would need to be undertaken to maintain good braking performance under wet conditions.

### 5.2.3 Development of the Runway Extension Design Criteria

Following this analysis, it was necessary to develop a set of design criteria to inform the consenting process and the development of the various assessments.

#### 5.2.3.1 Aeronautical Design Criteria

Any extension to the runway must be undertaken in accordance with CAA design requirements for aerodromes. There are minimum safety requirements that must be achieved with regard to runway design and geometry, taxiway and protection area specifications.

As noted, Wellington Airport currently operates with a 150m protection area at each end, each including a 90m RESA. Given the assessed costs of the extension, it was not considered practicable to provide a longer RESA, so WIAL proposes a 90m RESA as part of the overall proposed runway extension. A request was made to the Director General of Civil Aviation to continue to include a 90m RESA. This request was accepted in March 2015<sup>33</sup>. Taking into consideration the relevant CAA rules, together with the Astral analysis, the runway extension therefore must achieve the following aeronautical design criteria:

**Table 5-1: Primary Runway Aeronautical Design Criteria.**

Criteria	Requirement
<b>Runway Specifications</b>	Minimum 2,300m TORA Minimum 2150m Landing Distance Available
<b>Protection Areas</b>	90m RESA 60m Runway Strip
<b>Taxiway Specifications</b>	107.5m from runway, centre line to centre line.

<sup>32</sup> It is noted that the existing runway is grooved, and any extension would be similarly treated.

<sup>33</sup> This acceptance is subject to judicial review proceedings by NZALPA and a decision is expected in due course.

### 5.2.3.2 Engineering Design Criteria

Given that Wellington Airport's runway is currently constrained at either end by the CMA, it was identified that enabling an extension would likely be through land reclamation, or a pile supported structure. WIAL engaged AECOM to assist with determining the engineering feasibility of extending the runway to meet the aforementioned aeronautical design criteria.

#### ***Seismic Performance Objectives***

In undertaking preliminary engineering analyses, AECOM developed seismic design criteria for the proposed runway extension. This was achieved by performing a site specific probabilistic seismic hazard analysis. The criteria developed for the Project comprise 500 year and 2,500 earthquake events. It was considered that the performance objective for the 500 year earthquake design event should match the Airport's current post disaster operational requirements, which include the Airport being operational, potentially with a shortened runway, while minor repairs (filling in cracks in the runway, levelling the landing surface) are undertaken.

For the 2,500 year event, the performance objective is to have no catastrophic failure of the perimeter rock dyke that would surround the runway extension. From an engineering perspective, this was interpreted to mean that the rock dyke and the runway platform will remain stable following the 2,500 year event, although extensive re-construction would likely be required in order for the runway to resume commercial operations.

#### ***Wave Heights***

A 100 year wave/storm design criteria was developed by AECOM for the proposed runway extension. This also informed the preliminary engineering design work, in particular the armour requirements to protect the rock dyke from the impact of these storm events.

## 5.3 PROJECT OBJECTIVES AND ALTERNATIVES ASSESSMENT

Following identification of the preferred runway length and confirmation that the current Airport location remains the most appropriate, WIAL developed suitable objectives to guide planning and implementation of the Project. These are set out in Chapter 1.

Following development of these objectives, WIAL commissioned AECOM to undertake the engineering feasibility assessment. The results of this assessment are presented in detail in **Technical Report 7**. The purpose of this assessment was to develop a preliminary construction methodology and engineering design for each option upon which further detailed analysis could be undertaken. In accordance with Objective 2 (e) it was then intended to apply a multi criteria analysis (**MCA**) in order to compare the environmental impacts of the north and south option relative to each other.

As a first step in this assessment, WIAL commissioned preliminary scoping reports which identified the range of environmental effects that would arise from extending the runway either north into Evans Bay or south into Lyall Bay via reclamation. As part of this work NIWA and AES undertook work that indicated that with respect to the biophysical coastal elements, similar environmental assessments for both Evans Bay

and Lyall Bay would be required. Early planning assessments also identified that the effects for both options would yield similar results (i.e. ecological, traffic, visual and landscape effects – albeit that these early visual and landscape assessments noted the greater population visually exposed to the northern extension option versus the south and the likelihood for greater disruption and changes required to the roading network if a northern extension was pursued).

As explained in **Technical Report 7**, thickness and engineering properties of the marine sediments in Evans and Lyall Bays are important considerations that influence the cost and construction methodology for the various options considered. The North Baseline project used existing available geotechnical information that characterised the thickness and properties of the marine sediments in Evans Bay. Sediment thickness overlying bedrock in Evans Bay is in the order of 40 to 50 metres deep. Much of this sediment layer has been determined to be susceptible to earthquake-induced liquefaction, a factor that significantly increases the likely cost to build in Evans Bay.

For Lyall Bay, existing geotechnical information presented an incomplete picture. As a result, the southern options were assessed using rather conservative assumptions for these properties, particularly with respect to the thickness of materials and their susceptibility to liquefaction. For some of the initial southern extension options, less conservative (or more optimistic) assumptions were used for the characteristics of the Lyall Bay marine sediments so as to assess the impact of the subsurface conditions on the Project's seismic performance and construction costs. It was identified that further geotechnical investigation was required to assess the feasibility of extending the runway south.

WIAL commissioned AECOM to undertake a supplementary geotechnical investigation, which was performed in order to obtain additional information on the soil strength and liquefaction potential of the marine sediments in Lyall Bay, as well as confirm the depth to bedrock (greywacke). The information obtained provided further understanding of the marine sediments, including that the potential for seismic-induced liquefaction of these sediments is very low.

The construction approaches for both the north and south options were driven by the need to construct a runway platform in and over water. There are two construction approaches that could be considered: a pile-supported structure (similar to a pier); or a platform built on reclaimed land. Following further investigation of these options, the reclamation approach was preferred because it offers the lowest lifecycle cost by a considerable margin.

In order to assess the options it was therefore assumed that the reclamation approach would involve:

- The construction a full section armoured rock dyke around the perimeter of the runway extension and building a reclaimed land platform inside the rock dyke using dredge-and-fill construction methods.
- Fill materials sourced from either sandy sediments or from land-based quarries, or a combination of both.

- A period of significant settlement, which can be accelerated by placing - then removing - any surcharge fill, with vertical wick drains, and/or using ground improvement methods.
- Construction of the required pavements, markings, lighting and runway markings to a reclaimed platform necessary to allow aircraft operations to occur.

A series of concept design options were developed based on the variables discussed above in order to determine the range of costs that might be expected from applying less conservative assumptions concerning subsurface conditions and soil improvements, variations in construction approaches, and different seismic performance objectives.

From these options, a range of Project Alternatives were developed and evaluated in two phases. The first phase was completed prior to performing the additional soil boring investigation in Lyall Bay. This evaluation process is described in **Technical Report 7**.

Based on the results of the additional geotechnical investigation in Lyall Bay, further options for the southern extension were identified and assessed. In total, 13 Project Alternatives were identified and assessed. These options and results of the assessment are described in Section 4.8 of **Technical Report 7**.

Following the results of the engineering optioneering assessment, the cost analyses revealed that the cost to extend north was significantly greater than the cost to extend the runway south by a factor of almost 2. Given this outcome and the significant cost weighting in favour of the south option, WIAL excluded the northern option from further assessment as it would not be a cost effective option under any feasible build scenario.

Further work was then completed on investigating the various southern options as well as a north/south hybrid option as explained in **Technical Report 7**. As a result of this analysis, Project Alternative 10 (as described in **Technical Report 7**) is recommended as the preferred option. This option achieves the Project's objectives on an operational, cost, engineering and environmental basis.

## 5.4 PREFERRED ENGINEERING OPTION AND CONSTRUCTION METHODS

As described in more detail in Chapter 4 of this report, the preferred option to extend the runway south comprises the following key elements:

- A reclaimed land platform construction using a combination of marine and land based methods;
- Fill materials to consist of sandy marine sourced sediments, and/or land sourced fill from local quarries, or a combination of the two;
- A full section rock dyke around the perimeter of the reclaimed land platform;



- Potential for ground improvement of the marine sediments under the rock dyke using stone column installation methods;
- Protection of the section of Moa Point sewer outfall that extends under the reclaimed land platform;
- Ground improvement of the reclaimed land platform using vibro-compaction methods to accelerate settlement of the reclamation fill materials;
- Airfield infrastructure, including grading, paving and utilities;
- Aeronautical ground lighting and navigational aids;
- Modification of the existing roadway tunnel under the runway and a new tunnel or bridge structure under the taxiway extension;
- Urban design features and landscape mitigation.

Once the preferred option had been identified and confirmed from an engineering feasibility and cost (practicable) perspective, WIAL engaged various independent technical experts to assess the construction methodologies and environmental effects arising from the construction of the Project, and subsequent operation of the extended runway configuration and make recommendations for mitigation requirements. In undertaking these assessments, alternative construction methodologies including fill sources, haulage routes and airport constraints have been considered. The following section provides a summary of these alternative investigations and determination of the preferred option where possible.

#### 5.4.1 Alternative Fill Sources

Noting that considerable volumes of fill were going to be required to construct the proposed runway extension, investigations were undertaken to identify the available and viable fill sources that could be used. While it is again noted that the design work for the Project is preliminary, and that detailed design may result in changes to the assumed materials and methodologies, the construction of the reclamation will necessitate a significant volume of material being sourced and placed to form the proposed runway extension. The following identifies the potential fill sources that have been investigated as part of WIAL's assessment of alternative options.

**Table 5-2: Potential Fill Sources.**

Material Type	Potential Source	Transportation Method/Constraint
<b>Gravel and Rock</b>	<p>Smaller sized rock and stone for the Stone Columns and Rock Dyke may be sourced from quarries within the Wellington region and brought to the site.</p> <p>Large rock sources potentially available in Nelson,</p>	<p>Rock from the Nelson/Collingwood areas would be transported by sea, whilst rocks from other sources will most likely come by road (possibly being trucked to a barge loading site then delivered to the site via marine transport).</p>

	Collingwood, Taihape, Linton or Taranaki	
<b>Bulk Fill</b>	Marine sediment dredge material	Barged directly from the extraction site to the construction site.
<b>Bulk Fill</b>	Quarry run Small hillock within Airport land (refer to Drawing G.10 of Appendix L to <b>Technical Report 7</b> )	Trucked directly from the quarry or fill source to the construction site.

Although WIAL has identified that there are viable sources of fill available for the construction of the proposed runway extension, the preferred source of fill material will be confirmed following detailed design of the Project. Depending on the final selection of fill material and the combination of marine and land based sources, there will be variations in the plant, equipment and methodologies that will need to be employed in the construction of the Project. These alternatives are described in the Construction Methodology Report attached as Appendix L to **Technical Report 7**.

Despite these potential variations in construction plant and equipment, the engineering assessment confirms that the overall effects are likely to be similar. With respect to other elements of the Project, it is noted that environmental assessments have been assessed on the worst case scenario basis (i.e. all fill material having to be transported on the road network, rather than being barged to the site) and are therefore considered to be conservative in this regard. This is discussed in further detail in Chapter 7 to this report.

#### 5.4.2 Alternative Transportation Routes

Due to the large quantities of construction material and fill required to undertake the runway extension works, an assessment of potential road based haulage routes was undertaken to determine which route has the capacity to safely accommodate the significant increase in heavy vehicle movements to and from the construction site. Prior to public consultation occurring, TDG identified four potential haulage routes. These are described below.

##### 5.4.2.1 Alternative Haulage Route 1

Alternative Haulage Route 1 involves transportation via the following roads:

- SH1 (Cobham Drive and circulating the roundabout at Calabar Road) onto Jean Batten Street (via a new intersection connection), Rongotai Road, Cairns Street, Bridge Street, Coutts Street, Tirangi Road, Lyall Parade and Moa Point Road; and
- Return on same the route to SH1 via Jean Batten Street.

A preliminary review of this option identified several road safety and transport efficiency concerns. These concerns would be very difficult to resolve to enable this route to be used efficiently and effectively by trucks.

This option would require the construction of a new intersection at Cobham Drive / Jean Batten Street to enable two-way flows.

Due to the carriageway width and current parking demands on Jean Batten Street, two-way flows would potentially have a significant impact on the existing businesses located on this street by way of the need to remove parking. Two-way truck movements are also not possible at the southern corner of Jean Batten Street where it intersects with Rongotai Road, and likewise at the next acute intersection with Cairns Street. Additionally, trucks would need to slow on Cobham Drive prior to turning left into Jean Batten Street. Even with a deceleration lane, the movement would impact on the capacity and operational performance of Cobham Drive and upstream on the existing dual lane roundabout at Cobham Drive / Calabar Road.

#### **5.4.2.2 Alternative Haulage Route 2**

The second alternative route provided for trucks to travel via Cobham Drive then turn at the dual lane roundabout into Troy Street. From there trucks would travel on Rongotai Road, Cairns Street, and follow the same road route to Moa Point Road as Alternative Haulage Route (1). These vehicles would then return on the same route to SH1.

The inbound route was considered to provide a practical road transport option, with widening improvements at the Troy Street intersection with Rongotai Road required to facilitate the left turn of 23m long vehicles. However, right turn movements on the return trip onto Troy Street are physically prohibited. All motorists intending to travel north from this intersection would be required to progress westbound on Rongotai Road and then complete a right turn through the central median, located immediately west of the intersection. In order to complete this manoeuvre, vehicles would have to pass over two pedestrian crossings.

Due to these particular constraints, and the likelihood of conflicts with following traffic caused by right turning trucks at the median, this assessment also investigated the potential to construct a new temporary turn in the median opposite the exit from Rongotai Road (east). It was concluded, however, that the configuration would be complex and present potential new safety issues in terms of conflicts with westbound traffic on Troy Street and confusion with adjacent exits from Salek Street. It was not considered any further.

#### **5.4.2.3 Alternative Haulage Route 3**

The third haulage route considered provided for trucks to turn right from Cobham Drive onto Troy Street from where they would travel via Salek Street, Coutts Street, Tirangi Road, Lyall Parade, and Moa Point Road to the site. These same roads could then be used on the return route to Cobham Drive.

As an established residential road, Salek Street has traffic calming measures built along its full length with supplementary signage designating the road as a 'Slow Zone'.

Similar sensitivities exist in Coutts Street, which also provides access to Rongotai College, which generates significant pedestrian activity across the road. Despite being

part of the defined over dimension vehicle route (**OVR**), it was concluded that this route option would be the least desirable of the three primary alternatives considered, for the reasons described, and does not present a viable alternative.

#### **5.4.2.4 Alternative Haulage Route 4 and Initial Preferred Haulage Route**

The fourth haulage route considered provided for inbound traffic to enter the site via SH1 to Stewart Duff Drive. The inbound route would continue along Stewart Duff Drive onto the private section of the road through the Airport to the construction site. Under this option, the outbound traffic route would be via Moa Point Road and Lyall Bay Parade to the intersection with Tirangi Road. The route follows Tirangi Road, turns right into Coutts Street, left into Bridge Street and then follows Cairns Street, Rongotai Road and Jean Battern Street out onto SH1 via a new left-turn-only intersection. Prior to public consultation, this was the preferred haulage route.

During public consultation residents living along Bridge Street and the short section of Coutts Street between Bridge Street and Tirangi Road in particular, raised concerns with the proposed haulage route. There was concern about potential noise and amenity effects arising from increased traffic movements in this area. In light of this feedback, WIAL commissioned TDG to further assess alternative haulage route options in and around the Airport site, as well as AECOM to assess the potential effects arising from traffic noise along the identified routes.

#### **5.4.2.5 Development of the Preferred Option (post Consultation)**

An assessment into night time only haulage of material via the main arterial routes through the city and into and out of the construction site via SH1 (Stewart Duff Drive) was initially considered. While this was viable from a traffic perspective, noise effects along some of the inner city residential routes were not considered to be acceptable and the number of dwellings affected made mitigation to address these effects impractical.

Following this, further analysis was undertaken by AECOM (Engineering) and TDG into the likely traffic numbers, including how much material could be stockpiled at the construction site. This work identified that a reduction in the number of heavy vehicle movements to and from the site would be achievable.

Noting this reduction in weekly movements, TDG and AECOM (Construction Noise) then reviewed the current capacity and constraints on the existing roading network, on an hourly basis, to determine how these weekly movements might be accommodated on a daily and hourly basis. Specifically, AECOM (Construction Noise) reviewed the potential noise impacts of trucks and trailers passing through residential areas on a 24 hour basis, while TDG reviewed the existing traffic flows to determine where and when in the network space capacity existed.

This combined review concluded that a reasonably upper limit of 310 trucks per day to the site could be accommodated, with a maximum of 160 truck movements occurring at night time along SH1 (and to and from the site via Stewart Duff Drive) and a maximum of 150 trucks during the day time, with inbound movements occurring via SH1 and outbound movements via Moa Point Road, Lyall Parade, Onepu Road and Evans Bay Parade linking back to SH1 at the Evans Bay Parade lights.

This presented a suitable option from both a traffic and noise perspective, with appropriate limitations as to the number of heavy construction haulage vehicles occurring each hour being more restrictive during night time hours, and avoidance of peak commuter times, and weekends. For the sake of clarity, **Table 5-3** below outlines the hourly haulage movements on public roads that would deliver this daily upper limit of 310 trucks to the site.

**Table 5-3: Hourly Movements of Haulage Trucks.**

Time of day	Night time route	Day time route
00:00	25	0
01:00	15	0
02:00	5	0
03:00	10	0
04:00	20	0
05:00	30	0
06:00	0	0
07:00	0	0
08:00	0	0
09:00	0	15
10:00	0	30
11:00	0	30
12:00	0	30
13:00	0	30
14:00	0	15
15:00	0	0
16:00	0	0
17:00	0	0
18:00	0	0
19:00	0	0
20:00	0	0
21:00	0	0
22:00	30	0
23:00	25	0

This option represents the proposed haulage routes and is described in Chapters 1 and 4.

#### 5.4.2.6 Road to Wharf or Barge Site

Barging material to the site may also be a viable alternative for transporting some of the main materials direct to the construction site, and in such instances, would reduce the road transportation requirements. Following detailed design, the selection of a preferred contractor and securing of fill material, barge options may be required from one (or more) of a number of locations around the inner Wellington Harbour, including at Seaview, Petone, Kaiwharawhara and CentrePort, or from the Nelson area. In each instance, transportation by barge would require an initial road transport component. If additional consents or approvals are required, further assessment of the road network may be required.

#### 5.4.3 Obstacle Limitation Surface and Construction Hours

CAA regulations require airport operators to provide OLS around airports to ensure the safe operation of aircraft on approach and take-off. Comprising a series of geometric surfaces that project up from the runway, the defined surfaces represent areas within which objects cannot enter or penetrate in the interests of aircraft operational safety and efficiency. The existing OLS for Wellington Airport was identified as potential constraint for construction of the proposed runway extension. In order to manage this, WIAL engaged Astral to review the proposed construction methodology to ensure that construction can be undertaken concurrently with safe airport operations (refer to **Technical Report 8**). As part of this review, Astral considered options in order to mitigate or manage the potential effects of construction on aircraft safety. This assessment is described below.

Construction equipment and/or activity that penetrates the OLS must either be performed between aircraft movements or outside the operational hours of the airport. Given the inherent difficulties associated with such restrictions (i.e. working at night and inefficiency in demobilising equipment between flights), alternative options for mitigating the impacts of the OLS on construction have been considered. Potential options include:

- Increasing the height of the OLS;
- Removing the source of the penetration;
- Enabling the penetrating obstacles to be observed and avoided by pilots;
- Increasing the height of the aircraft flight profiles so aircraft safely clear the penetration; or
- A combination of the above.

##### 5.4.3.1 Increasing the height of the OLS

Increasing the height of the OLS can, for the approach OLS, be achieved by displacing the landing threshold and with it the origin point of the OLS or steepening the OLS gradient. This is possible for landing on runway 34 by displacing the threshold 100m north and increasing its upslope from 2.0% to 2.5% which is permitted under AC139-6 for domestic aerodromes.<sup>34</sup> This option would also require alterations to the runway lighting, marking and instrument approach procedures.

<sup>34</sup> Taking the view that for a domestic flight the aerodrome can be regarded as a “domestic aerodrome”.



#### **5.4.3.2 Removing the source of the penetration**

Removing the source of the penetration would mean not permitting certain construction equipment within the OLS area while aircraft operations are occurring. This would mean work would be disrupted during the Airport's operational hours to the point where little progress could be made. This option is therefore only practical for aircraft operations that occur relatively infrequently (such as international departures or arrivals), or when the aerodrome is closed to aircraft movements i.e. in the curfew hours.

#### **5.4.3.3 Enabling the penetration to be seen and avoided**

Enabling the OLS penetration to be seen and avoided is not considered practical for penetrations so close to the end of the runway. When an aircraft reaches this level of approach the aircraft should not be manoeuvred other than as required to remain on the correct approach path. On take-off, due to the nose high attitude of the aircraft, the pilot is not able to easily see a close-in obstacle to enable it to be avoided. This option is therefore not appropriate.

#### **5.4.3.4 Increasing the height of the aircraft profile**

Increasing the height of the aircraft flight path is not possible on approach as the approach glide path is fixed at 3.0 degrees by both the ILS glide path and the PAPI settings. While a steeper approach could be used with a new temporary PAPI, 3.0 degrees is the international standard and to use an appreciably steeper path requires specific crew training and increases the risk of heavy landing due to the higher vertical descent speed.

Increasing the height of the flight path on take-off is possible by reducing the take-off weight of the aircraft. Taking account of flight path obstacles is standard airline procedure in calculating the aircraft weight limit under the existing ambient conditions for each take-off. While a potentially viable option for take-off, reducing aircraft take-off weight potentially reduces carrying capacity and therefore requires agreement from the aircraft operators, which may not be possible due to the potential commercial implications of flying aircraft with reduced loads.

#### **5.4.3.5 A combined approach**

A combination of these mitigations is viable. The preferred approach involves raising the height of the OLS and displacing the threshold (approach), raising the aircraft flight path (take-off) and eliminating the penetration (approach and take-off) by controlling access of construction equipment under the OLS.

## **5.5 SUMMARY**

As a result of the optioneering process and the extensive engineering and environmental advice, WIAL considers that the preferred option is an extension south into Lyall Bay. This option meets the key runway and RESA specifications, and is the subject of a detailed description in Chapter 4.

Chapter 7 provides an assessment of effects arising from the Project. This assessment has been based on the proposed construction methodology described in Chapter 4. In

assessing the potential effects arising from the construction and operation of the runway extension various mitigation options have also been considered. Further detail regarding these assessments and the various mitigation options available is contained in Chapters 7 and 8.

## 6. CONSULTATION

### 6.1 INTRODUCTION

This chapter outlines the strategy and methodology of consultation and engagement that was undertaken for the Project, and sets out the:

- Consultation Requirements and Objectives
- Consultation Process
- Key Consultation Methods and Events
- Consultation Feedback and Responses

### 6.2 STATUTORY MATTERS

Consultation in the RMA sense has been clearly articulated through case law over time as follows:

*"Consulting involves the statement of a proposal not yet finally decided upon, listening to what others have to say, considering their responses and then deciding what will be done".*

and

- "(i) The nature and object of consultation must be related to the circumstances.*
- (ii) Adequate information of a proposal is to be given in a timely manner so that those consulted know what is proposed.*
- (iii) Those consulted must be given a reasonable opportunity to state their views.*
- (iv) While those consulted cannot be forced to state their views they cannot complain, if having had both time and opportunity, they for any reason fail to avail themselves of the opportunity.*
- (v) Consultation is never to be treated perfunctorily or as a mere formality.*
- (vi) The parties are to approach consultation with an open mind.*
- (vii) Consultation is an intermediate situation involving meaningful discussions and does not necessarily involve resolution by agreement.*
- (viii) Neither party is entitled to make demands.*
- (ix) There is no universal requirement as to form or duration.*
- (x) The whole process is to be underlain by fairness."*

Although there are no specific statutory requirements for consultation under the RMA<sup>35</sup>, it makes sense to do so, particularly for a project of this nature and scale. It also makes sense to conduct a careful and strategic consultation process that informs the AEE. In particular, Clause 6(1)(f) of the Schedule requires that an AEE must include

<sup>35</sup> Reference to consultation is set out in the Fourth Schedule (persons affected by the application must be identified, any consultation undertaken, and any response to the views of any person consulted must be set out), and with reference to section 8 – Treaty of Waitangi.

identification of the persons affected by the activity, any consultation undertaken and any response of the views of any person consulted.

### 6.3 CONSULTATION OBJECTIVES AND PRINCIPLES

WIAL has adopted the following objectives and principles with regard to its approach to consultation for the Project:

- Consult openly, honestly and with integrity during all stages of the Project.
- Ensure that key stakeholders and neighbours have early access to factual information so that they can reach an informed view about the Project, and how it might affect them.
- Provide an accessible feedback loop so that those interested in the Project can provide feedback to WIAL, and that any action taken as a result of that feedback is articulated to interested parties.
- Ensure that WIAL is well-informed of concerns about the project and can incorporate these, as appropriate, into the design of the Project.
- Engender support for the Project from the wider community, wherever possible.
- Ensure that any ill-informed views and campaigns against the Project are minimised in number and in their potential to impact on the views of other parties.
- Create a constructive relationship that maximises the potential for achieving agreed outcomes with stakeholders.
- Minimise the risk of protracted litigation.

In order to achieve these objectives, the following consultation principles were also adopted:

#### **Access to Information**

*That persons who will or may be affected by, or have an interest in, the Project should be provided with reasonable access to relevant information in a manner and format that is appropriate to the preferences and needs of those persons.*

The focus of this principle is access to information. Access to background information and technical assessment is important, and the manner in which it is delivered will require careful consideration.

#### **Encouragement to Present Views**

*That persons who will or may be affected by, or have an interest in, the Project should be encouraged to present their views.*

An important first step as part of any consultation strategy is that the statutory organisations, key stakeholders and affected communities who may be affected by, or have an interest in the Project, have been identified and contacted prior to information being disseminated to the wider public.

***Reasonable Opportunity to Present Views***

*That persons who wish to have their views on the Project considered should be provided with a reasonable opportunity to present those views in a manner and format that is appropriate to the preferences and needs of those persons.*

This principle indicates a need for WIAL to approach its consultation procedures with some flexibility as to how views are to be sought, e.g. face to face meetings, collective discussion, written submission, or other means of presentation.

***Views Presented Considered with an Open Mind***

*That the views presented should be received by the approved organisation with an open mind and should be given due consideration in making a decision.*

This principle relates both to receiving views and to the deliberation and decision process. In any situation where there is a formal requirement to consult, the Courts have long established that the consultation must be approached with an open mind.

***Consultation Feedback***

*That person who presents views should be provided with information concerning both the relevant decisions and the reasons for those decisions.*

This principle emphasises the importance of preparing robust decisions. All parties who have been involved in the consultation process should be informed about the decisions which are made, supported by reasons.

## **6.4 KEY CONSULTATION EVENTS AND FORUMS**

### **6.4.1 Public Open Events**

Three public open events were held in December 2015. The events were held over four days between Wednesday 2 December – Saturday 5 December, at various locations and times to provide flexibility for those who were interested. The locations were chosen to make it convenient for those residents and groups who were likely to be most impacted and to ensure easy parking.

The locations and times included:

- A lunchtime event in a central city location – Chaffers Dock Function Centre
- A mid-week evening event at the SPCA Fever Hospital, Mt Victoria
- A Saturday daytime event at the Brentwood Hotel Conference Centre in Kilbirnie.

The open day events provided the opportunity for people to find out as much information as they wanted and to provide feedback. To achieve this each area of the project had project team members and consultant experts available to have one on one dialogue with attendees.

Also available was information in the form of a summary document which is attached as **Appendix H**, and access to all the draft technical reports on USB drive.

The technical experts were on hand for specific questions, included those who have expertise in coastal processes (NIWA, DHI), coastal ecology (NIWA), engineering and construction (AECOM), noise effects both during construction and operational (AECOM and Marshall Day), landscape and urban design (Boffa Miskell), route viability and economics (WIAL and Sapere), traffic (TDG), air quality (AECOM) and planning (Mitchell Partnerships).

Detailed information panels, videos and plans were on display to assist in ensuring that a full understanding of the Project could be obtained from attending the open day events.

People attending the open days were invited to provide feedback via forms available on the day, or to provide comments via the Project website. Twelve written forms were collected during the open day events, and all of these with the exception of one person who was neither for nor against, expressed support for the proposal.

For record keeping purposes, a “sign in” sheet was made available and for those who elected to fill this in, they were able to provide their names, contact details and advise whether or not they would like to be kept informed of the Project and receive updates. In total 103 names were officially recorded, however around 200+ people attended the events over the course of the three days.

#### 6.4.2 Project Website

Since September 2014 information and updates relating to the Project and the consultation process has been available on WIAL’s dedicated Project website <http://connectwellington.co.nz/>.

The information available on the website included a general overview of the history of the Airport, a description of the reasons for and benefits of the runway extension, details around the indicative construction methodologies and process.

The site also contained all draft technical assessment reports, along with high level summaries and the summary document, and invited members of the public and interested parties to provide comments and feedback on the Project generally, or with reference to the specific technical documents available for review. These technical assessment reports were released onto the website on 25 November 2015, two weeks prior to the open day events.

A total of 642 people (or groups/organisations) either provided feedback or comments or subscribed to updates on the proposed runway extension. Of these:



- 361 were in support of the proposal,
- 8 provided conditional support,
- 74 were in opposition of the proposal,
- 10 were neither expressly for nor against the Project.

#### 6.4.3 Media Releases

A number of media statements were released to announce the consultation timeline, publicise the commencement of consultation, and remind people of closing dates and to thank the community for their feedback and involvement. Online articles and commentary on the project, driven from media releases and news, yielded around 2,000 individual online stories on the subject of the runway extension between September 2014 and March 2016.

#### 6.4.4 Advertising

An advertising campaign was undertaken using print and radio media. Radio and newspaper ads informed the community and public about key consultation events (i.e. open days, closing dates for feedback etc.). Display boards informing Airport passengers and users about the proposed runway extension were also located throughout the terminal building at the Airport.

The advertising on the public consultation and open days commenced a week prior to the release of the draft technical assessment reports and opening of the public consultation. Advertising ran throughout the consultation period, including reminding people when the opportunity for written feedback was about to close.

##### ***Email and Mail***

Emails were used to promote the consultation to those who had previously registered for updates on the website. Moa Point residents were also mailed regarding initial meetings and the consultation process.

Residents around the airport were advised about the consultation in a newsletter drop and a reminder letter that the opportunity for written feedback was about to close was also sent which highlight the main feedback that had been received to that date.

Posts were also made on social media to advise about the consultation and open day events

#### 6.4.5 Meetings and Individual Consultation

From as early as August 2014 and throughout the public consultation phase for the Project a number of meetings were held with affected parties, neighbours as well as the regulatory authorities and key stakeholders on a regular basis. This consultation has also included members of the Project team responding to phone and email queries, concerns and requests that have been made.

## 6.5 CONSULTATION PROCESS AND OUTCOMES

The goals for the consultation process were to:

- Identify and understand stakeholder and community of interest issues;
- Provide information on the proposed project and its impacts;
- Robustly consider options for integrating issues and ideas into the decision making process;
- Ensure the wider community and members of the public had ample opportunity to participate in the consultation process.

The process and methods for achieving these aims is discussed below.

### 6.5.1 Consultation with Directly Affected Parties and Neighbours

While there was engagement with some interested residents prior, an initial meeting with Moa Point residents was undertaken on 29 September 2014. Further dialogue with these residents occurred and all residents were mailed and invited to a meeting to present all background information and preliminary findings of technical assessments which occurred on Wednesday 3 June 2015. Feedback was invited and dialogue between WIAL and people residing in this area is ongoing.

As WIAL was consulting with a group of residents, who lived in the same street, but had different individual concerns and circumstances, it undertook one on one dialogue with those individuals who wanted it.

All Moa Point residents were also mailed and invited to attend public open days and to provide feedback to WIAL, and were mailed again to remind them that consultation was closing.

Key feedback received from Moa Point residents included:

- *WIAL should consider property purchase as a mitigation option:*
  - *Valuation – how will this be determined, what is the methodology? Will the valuation be affected by the extension, if so what is the quantum?*
  - *Valuation should properly take into account uniqueness of Moa Point*
  - *Compensation on capital value.*
- *Would like to understand the visual effects from individual properties.*
- *Concern re geological processes affecting the runway extension – earthquakes, tsunamis, waves.*
- *Existing airport operational issues of concern to the group:*
  - *Rubbish in and around the Moa Point area.*
  - *Street lighting and pedestrian safety along roads and tunnel.*
  - *Signage at junction seems to be ineffective – a number of vehicles end up on Moa Point and have to do u-turns.*

- *During floods the tunnel gets covered in silt and this presents safety issues for pedestrians.*
- *Southern parking ticket machine seems to be faulty.*
- *Consideration of compensation relative to the duration/significance of effects created by the construction of the runway extension as a mitigation/offsetting option.*
- *Would like access to the business case analysis and other information relating to the extension early and for consultation to continue and to be effective.*
- *Noise insulation as a mitigation option:*
  - *Would have a dual purpose – mitigation against construction noise and aircraft noise.*
  - *The difference between insulation for construction noise and aircraft noise was queried.*
- *Will the effect of aircraft fumes increase?*

As a result of this meeting WIAL made an offer to purchase properties in the Moa Point area, if and when the Project proceeded. At the request of specific property owners, individual meetings along Moa Point Road were also arranged to discuss the proposed property offer made by WIAL, or to address specific questions and concerns with the proposal. The discussions were focused on the timing of potential purchase and the quantum of the solatium offered by the property offer proposal, but discussions addressed other elements of the project in so far as the seeking to identify the drivers for WIAL making the offer, specifically relating to construction effects and the long term visual effects of the Project.

In three instances, the respective property owners expressed a strong desire to sell their properties to WIAL now, and in one particular instance, citing an immediate health issue as justification. This was subsequently considered, and at the time of preparing this Assessment of Environmental Effects document, specific policy is being prepared to deal with 'special circumstances' whereby a purchase earlier than the property offer anticipated might be able to be made.

At that time other residential neighbours were contacted who were potentially affected by the then proposed haulage route (i.e. Bridge Street). The first point of contact to these residential neighbours was the provision of a letter which included information relating to the Project such as the purpose, the required Council approvals and the technical assessment reports that are being undertaken.

The letter also provided a very brief summation of the key local effects arising (i.e. construction noise / traffic assessments), and invited the recipient to attend public open days where more detailed information will be provided, as well as the opportunity for feedback.

Another group meeting with Moa Point residents was held on Monday 18<sup>th</sup> April 2016. Prior to the meeting draft conditions were circulated for comment and feedback, and these were discussed during the evening.

Consultation with immediate non-residential neighbours (i.e. Veolia (wastewater treatment plant), and other commercial/industrial activities) also occurred. This has been generally positive and no significant concerns about the proposal have been raised by these parties. With regard to the potential effects of the proposal concerning Veolia, a portion of the Moa Point outfall is located beneath the footprint of the proposed runway extension. This has necessitated further engineering assessment to determine an appropriate solution to managing or mitigating any potential effects on this infrastructure asset. These are described in Chapter 8 and **Technical Report 7**. Consultation with this utility owner will continue and an agreement will be reached as to the appropriate course of action to be taken to manage any potential effects on this infrastructure. This is detailed in Chapter 8 – Mitigation.

### **6.5.2 Consultation with the Community of Interest, Community and Recreational Groups**

There are a number of recreational uses of Lyall Bay and the surrounding area that will have an active interest in the project.

Early contact was made with the Wellington Board Riders in September 2014. As dialogue has continued this was expanded to include the Surf Protection Society and Lyall Bay Surf Club.

A collaborative discussion between WIAL and the surfing community has been facilitated in respect of what the coastal processes report means for on the use and surf of Lyall Bay, and potential mitigation options.

This included WIAL providing the Boardriders with some funding to engage their own independent expert to assist with reviewing the findings and proposals of both NIWA and DHI, and for the Board Riders to make recommendations. There has been significant information sharing between WIAL, the Board Riders and Surf Protection Society including reviews of the technical assessment reports, and proposed draft conditions.

WIAL also arranged for two meetings between the Board Riders, Surf Protection Society, NIWA and DHI for a caucusing of experts to discuss findings and review recommendations. These meetings occurred on Saturday 9 May 2015 and Thursday 3 December 2015. These meetings were in addition to regular ongoing email, phone and smaller meetings throughout the course of 2015. Discussion on the final draft conditions insofar as they relate to mitigation on surfing effects is ongoing.

Feedback received during this consultation included:

- A desire to protect “the Corner” surfbreak.
- Ensure the surf is at least the same, but ideally better than it is now.
- Guaranteeing that mitigation will be maintained and looked after for the life of the runway.
- That mitigation in the form of an artificial wave focusing structure will not affect “the Corner” surf break or have adverse inshore effects.

- Extensive pre and post monitoring to ensure effects are as predicted and mitigation is working as intended.
- The desire for a big wave surf spot to replace “Airport Rights”.
- Ensure the effects of the extension or wave focusing structure will not impact the location of the surf lifesaving clubs.
- Ensuring the assessments on surf effects have used valid data and that data gathering has been taken over an adequate period.
- That Lyall Bay and “the Corner” will be usable and will not be affected during construction.

### 6.5.3 Consultation with Tangata Whenua

In order to fully understand the existing cultural values and potential effects of the Project WIAL commissioned the preparation of a Cultural Values Report and Cultural Impact Assessment (CIA). These reports were prepared by Raukura Consultants Ltd (refer **Technical Reports 5 and 13**).

There are three iwi groups who are identified as exercising kaitiakitanga within the WCC geographical area, and which have a direct interest in the applications. They are:

- Taranaki Whānui ki te Upoko o te Ika (Taranaki Whānui);
- Te Atiawa (Wellington); and
- Ngāti Toa Rangatira.

Of these three iwi, it is understood that the Wellington Tenth Trust and Palmerston North Maori Reserve Trust<sup>36</sup> and Port Nicholson Block Settlement Trust are the relevant iwi authorities for Te Atiawa (Wellington) and Taranaki Whānui. Consultation with this iwi authority has been undertaken by WIAL.

Following the assessment of cultural values, WIAL invited and met with local Iwi and provided a full overview of technical reports on Thursday 4 June 2015. Attendees at the meeting included representatives of the Wellington Tenth Trust, the Port Nicholson Block Settlement Trust and Te Runanga O Toa Rangatira Incorporated, the recognised iwi authority representing the interests of Ngāti Toa Rangatira. A draft CIA was also prepared on behalf of Ngāti Toa Rangatira and this is currently being finalised.

Subsequent to this meeting, a number of separate follow up meetings have occurred with representatives of Te Runanga O Toa Rangatira Incorporated and the Port Nicholson Block Settlement Trust.

<sup>36</sup> Palmerston North Maori Reserve Trust and Wellington Tenth Trust are known as “sister trusts”. This is because they emanate from the same parents, that being the land and waters at Te Whanganui a ara. Both Trusts are comprised of etehi o nga hapu/iwi o Taranaki who are mana whenua at Te Whanganui a Tara.

Both organisations were particularly interested in the potential effects of the proposal on the kai moana resources in the vicinity of the Project as well as the potential for the reclamation process to use marine sediments from the CentrePort proposed dredging projects.

WIAL recognises the long association of tangata whenua within this area, and the preparation of the various Cultural Impact reports has further assisted in fully understanding the potential effects of the proposal from the tangata whenua perspective.

#### 6.5.4 Consultation with Key Stakeholders

Consultation with key stakeholders such as transport and environmental agencies has occurred as information on the design of the Project and likely effects has become available. This has included meetings with:

- NZTA;
- CentrePort;
- Wellington City Council (at both Councillor and CEO/Executive levels);
- Greater Wellington Regional Council (at both Councillor and CEO/Executive Levels);
- Hutt City Council;
- Porirua City Council;
- Upper Hutt City Council; and
- Kapiti Council
- Regional Councils including Manawatu, Hawkes Bay, Nelson

In addition, and as part of the development of the CBA (refer **Technical Report 4**) WIAL hosted two workshops with airlines and key stakeholders to (at the first workshop on 2 August 2015) introduce the project, and outline the key areas where the runway extension might affect (positively or negatively) the local, regional and national economy.

The second workshop (30 November 2015) ran through the initial draft of the CBA and the passenger forecasts that the CBA was based upon and discussed the assumptions made to develop that draft. Workshop invitees, and recipients of electronic copies of presentations and the CBA included representatives from:

- Treasury
- Ministry of Transport
- Ministry of Business, Innovation and Employment (MBIE)
- Wellington Regional Economic Development Agency
- Wellington City Council
- Wellington Tenth Trust
- Te Runanga O Toa Rangatira Incorporated



- The Port Nicholson Block Settlement Trust
- Board of Airline Representatives New Zealand
- Air New Zealand
- Qantas Airways
- JetStar Airlines
- Virgin Australia

Feedback received during this consultation, including feedback received post workshops included:

- That the passenger forecasts seemed appropriate;
- That the passenger forecasts appeared to overstate the Chinese GDP forecasts and might therefore be overly optimistic;
- That the suggested rate of introduction of new long haul services seemed overly optimistic and therefore would overstate the passenger forecasts; and;
- That the introduction of the four-a-week Wellington-Canberra-Singapore fifth freedom service in September 2016 would further inhibit the introduction of new long haul services and therefore overstate the passenger forecasts
- That the CBA might overstate the value add percentage of visitor spend;

### **6.5.5 Consultation with Airport Users**

WIAL has consulted with key airport users such as Airways and the airlines regarding the future layout of the operational areas of the airport post runway extension and how the impacts of construction on operations might be minimised. These discussions were led by Astral Limited, and were directed to, following an outline of how the proposed runway extension might be constructed, to develop a suite of reasonable operational limitations what would enable certain elements of the construction to occur, while ensuring operational limitations to the airport users (through, for example, the temporary reduction in runway length to allow additional construction headroom for machinery working on the extension) are minimised as far as practical.

This dialogue will continue throughout the Project, and particularly during construction when the construction activities will need to be carefully managed to ensure appropriate integration with aircraft operations. These user groups will need to be well informed throughout the planning and construction phases of the Project.

### **6.5.6 Consultation with Regulatory Authorities**

WIAL has engaged with both Greater Wellington and WCC on a regular basis throughout the pre lodgement phase of the Project and in the preparation of the relevant application documentation.

WCC has been extensively consulted with regarding this Project in relation to its interests as a shareholder, as well as the regulatory authority. The City as an affected land owner (esplanade reserve and roading) has also been consulted with respect to the proposed roading works and works identified as being desirable mitigation within

the Urban Design assessment prepared for the Project. These urban design and landscape treatments will be undertaken in further consultation with WCC as outlined in Chapter 8 – Mitigation.

All three regulatory authorities (WCC, Greater Wellington and Department of Conservation) have also received copies of the draft technical assessments to undertake a pre-application review and follow up meetings have occurred.

### **6.5.7 Consultation with Interested Parties and the Wider Public**

As noted above WIAL provided an opportunity for interested parties and the wider public to become informed about the Project and provide feedback via a project website <http://connectwellington.co.nz/> which was launched on September 2014 and updated as the project progressed. Information relating to the proposed runway extension was also been placed on placards throughout the Airport terminal building.

## **6.6 SUMMARY OF PUBLIC FEEDBACK RECEIVED**

As detailed above feedback on the Project has been received via written comments provided at the open days, online feedback via the Project's website and via direct discussions or emails to Project team members.

All written feedback has been recorded in a Project consultation database and the details recorded included:

- Date feedback was received;
- Name and contact details of the writer (if known);
- Opinion on the proposed runway extension (for, against, neutral); and
- A summary of any comments made.

From the data collected, matters, issues and concerns were identified and recorded. An analysis of the summary of the comments received has been undertaken with a set of common themes being produced as a result.

As noted above around 700 written forms of feedback have been received on the Project (either via the website, or open day forms, or emails to the Project team). A variety of matters or issues were raised in the feedback received. These themes are outlined below and then discussed in turn.

- Benefits of the Project
- Funding concerns
- Project viability
- Construction traffic effects - haulage route
- Construction noise effects
- Visual and landscape effects
- Effects on the CMA
- Operational noise effects

- Natural hazards and climate change
- Alternatives

### 6.6.1 Benefits of the Project

Those in support of the proposal cited economic growth, increased tourism activity, better access and connectivity for the City as the main reasons why. For example, the Wellington Chamber of Commerce commented that a recent airport-specific survey indicates that a majority of its members still see direct long haul connections as being vital to the region. They refer to a January 2016 airport specific survey received 452 responses with 86% supporting the development of the runway extension project. 59% believe the Project will benefit their business and 88% believe it would benefit other businesses in the region. 89% believe it will benefit the region as a whole. A number of respondents also noted the benefits that direct access to Asia would bring specifically for business growth and international students.

### 6.6.2 Funding Concerns

A number of respondents, some of whom are generally supportive of the proposal and those in opposition, have expressed concern about the source of funding for the Project. The reasons cited for this include a lack of a clear business plan, and inappropriateness of using ratepayer funding.

### 6.6.3 Project Viability

Some respondents in opposition have expressed concern that the runway extension is not necessary and airlines will not be attracted to the Wellington market. A few respondents, such as BARNZ provided a detailed critique of the draft forecasting, viability and economic reports. A number of respondents have indicated that WIAL is using a “build it and they will come” approach and that this is not appropriate. Given this concern, it was appropriate that both InterVistas and Sapere were given an opportunity to reconsider their respective forecasting and cost benefit analyses. As part of this review, Sapere made additional contact with MBIE to ensure the value add proportion of visitor spend is appropriately addressed in their updated assessment. The Sapere work has been revisited on a number of occasions in the light of feedback received. The final report which is attached as **Technical Report 4** reflects the various comments and feedback provided through the course of the consultation process.

Conversely some respondents in support, considered the extension not to be long enough and expressed the view that a longer runway or a more extensive airport development is required to enhance viability of the Project.

### 6.6.4 Construction Traffic Effects

Some of the feedback received, particularly from those residents living along the outbound haulage route (i.e. along Bridge Street area), expressed significant concern about the use of these local roads as part of the construction haulage route. The concerns identified included noise associated with truck movements and disruption, particularly during the proposed evening transportation window, and potential vibration effects on residential homes due to the increase in truck movements. This prompted

WIAL to revisit the planned haulage route and to re-engage with its construction, transportation and acoustic advisors. The details of this process are set out below.

### **6.6.5 Construction Noise Effects**

A number of respondents raised concern about the potential for adverse noise effects arising during the construction period. Concern has been expressed that the construction noise assessment has underestimated the potential effects on residents during, in particular night time construction activities.

### **6.6.6 Visual and Landscape Effects**

The visual effects and changes to the landscape arising from the proposed runway extension have also raised concerns with some respondents. There is criticism that there is no mitigation available to address visual effects from the most affected views from up close viewpoints.

### **6.6.7 Effects on the CMA**

A number of comments or feedback received related to the potential impacts of the proposed runway extension on the CMA and coastal processes. For example, a number of residents living along Moa Point Road expressed concern that the technical assessments undertaken were not reflective of the existing environment and had potentially underestimated the effects of sea level rise and other hazards for example. A detailed analysis of the reports in question was provided. There was also concern raised about the effects on the changes to the coastal processes (i.e. waves and sediment flushing) in and around the Moa Point beach area.

A number of comments from the public and also more detailed feedback received from parties such as the Surfbreak Protection Society and Wellington Board Riders Club are specific to the Project's potential effects on surfing amenity within Lyall Bay. The comments received from these parties have been summarised earlier in this Chapter.

With regard to the proposed SWFS questions were also raised during the consultation phase as to whether this structure would be likely to create any adverse effect on the shoreline morphology along Lyall Bay. As indicted below, DHI was commissioned to assess and report on this matter. The resultant report is attached as **Technical Report 14**.

### **6.6.8 Operational Noise Effects**

Feedback with regard to operational noise relates to a general concern that the runway extension will lead to larger and louder aircraft operating in and out of Wellington Airport. Some respondents also stated that the night time curfew currently in place for the Airport must remain.

### **6.6.9 Natural Hazards and Climate Change**

Some respondents were concerned that the technical assessment reports have not appropriately factored in or have underestimated the adverse effects that could arise on the runway extension as a result of natural hazards and/or climate change (e.g. sea

level rise). It was suggested that the location of the extension and the coastal hazards, including climate change risk needs to be better recognised and assessed.

#### **6.6.10 Alternatives**

A few respondents also identified that they would prefer that the extension went north into Evans Bay, or that it is not clear why alternative options extension options were not explored further.

### **6.7 WIAL RESPONSES TO CONSULTATION FEEDBACK**

In accordance with the objectives and principles WIAL has adopted to guide the consultation phase of the Project, all of the feedback received has been carefully considered and project details revisited to determine whether further options to avoid or mitigate effects of concern might be available.

#### **6.7.1 Open Day Feedback and Public Comments**

Following the public open events and feedback received either via the website or directly to WIAL, three key areas of concern were identified by the Project team where potentially more work or consideration needed to be given. This related to the proposed haulage route for outbound heavy traffic along Bridge Street, potential erosion effects from the proposed surf wave focusing structure and the effects on the runway extension from sea level rise.

A response to each of these matters is provided below:

##### ***Transport Route for Reclamation Material***

The original proposed transport route had outbound trucks exiting the construction site via Bridge Street in Rongotai. While this was assessed as being well within the roading capacity, concerns were raised by residents during the consultation process. WIAL commissioned further investigation by TDG to review alternative options that could potentially reduce the effects of truck movements on these residents. Once TDG has identified a range of alternative haulage routes, noise experts AECOM were engaged to review the potential noise effects from transport using these alternative routes to ensure that those operations would be within acceptable noise limits. In addition to these two work streams further detailed analysis of the likely construction truck numbers was undertaken. As set out in Chapter 5, this has resulted in an updated forecast where it is predicted that fewer heavy vehicle movements will be required to construct the project than was originally thought. Based on this further work a revised approach to undertaking heavy construction related haulage has been developed and a revised haulage plan using the state highway network and Principal Roads has resulted. The details of this are described in Chapter 4.

It should also be noted that the technical assessments with regard to haulage material have been based on a likely worst case scenario of all material being transported to the site via the road network, rather than being barged by vessel to the construction site.

### ***Potential Erosion Effects from the Submerged Wave Focussing Structure in Lyall Bay***

As described in earlier chapters of this report a SWFS is proposed to be placed in Lyall Bay to offset the effects of the runway extension on surfing amenity. In response to this potential effect being identified during consultation, WIAL engaged DHI to further assess any possible in-shore effects from this structure in terms of potential beach erosion.

This preliminary study (**Technical Report 14**) has indicated that the structure could alter the existing erosional and accretion rates along the shoreline. However it is noted that the submerged focusing structure could slightly redistribute the mean position of the shoreline such that the recession in the lee of the structure is compensated equally by accretion along adjacent sections of the beach. It suggests that the structure may be placed such that the reorganisation of the shoreline due to the presence of the structure is a benefit for the management of the shoreline by causing accretion in a vulnerable location at the expense of recession in a location that is less vulnerable. Such an optimisation is considered to be possible and is recommended as part of the full concept design which will be undertaken in accordance with the SMAMP described in Chapter 8.

### ***Sea Level Rise***

The current southern end of the runway is 7.5m above sea level. The runway extension will be designed to have an upward slope in order to improve aircraft performance, meaning it will be 9m above sea level on completion. The effects of climate change on the performance of the proposed runway extension has been considered by NIWA and the findings are set out in **Technical Report 15** and summarised in Chapter 7.

### ***Forecasting and Economics***

As noted above, WIAL has requested that both Sapere and InterVistas revisit their respective reports in light of the feedback received during consultation. Sapere and InterVistas response to this feedback is detailed in their reports, as set out in **Technical Report 3** and **Technical Report 4**.

## **6.7.2 Detailed Technical Reviews or Submissions**

Where more technical analysis or critiques of the draft technical assessment reports in support of the proposed runway extension have been received, i.e. from feedback from the regulatory authorities on various draft reports or via the more detailed submissions from the public or organisations, WIAL has further engaged its experts to review and consider those comments.

Where appropriate changes or further detail has been provided by the respective expert in finalising their report in response to some of the matters raised or identified in these reviews.



## **7. ASSESSMENT OF ENVIRONMENTAL EFFECTS**

### **7.1 INTRODUCTION**

Under the RMA an assessment of the environmental effects of the Project is required. The purpose of this chapter is to outline how the AEE was undertaken for the Project and provide a summary of the results of the various technical assessments.

### **7.2 ASSESSMENT METHODOLOGY**

A number of technical assessment reports were prepared by independent technical specialists in order to inform a comprehensive assessment of the environmental effects associated with the Project. These specialists were also engaged to provide recommendations regarding appropriate mitigation measures and environmental monitoring to be undertaken by WIAL to manage adverse environmental effects.

The environmental effects associated with the proposed construction activities have been assessed based on the construction methodology which has been provided by the Project's engineers AECOM and described in Chapter 4. AECOM has extensive global experience with land reclamation and airport expansion projects. Subsequent detailed design and contractor innovation may result in alterations to the final construction methodology, however the current approach comprises a best estimate based on AECOM's worldwide experience with similar projects.

It is also noted that as part of some of the mitigation that is recommended, have triggered the need for additional consents and this has necessitated additional assessments of environmental effects relating to those components of the application. In particular, this is relevant to the proposed SWFS which has been described in Chapter 4 and in further detail in Sections 7.3.6 and 7.5 below.

Operational effects have been assessed on the likely finished profile of the Project, and a current understanding of the likely viable aircraft type that will be capable of using the proposed runway extension.

While each specialist was engaged to carry out an assessment within their field of expertise, there is some overlap in the information provided. An overview of the approach taken by the technical specialists in carrying out their various assessments, and a summary of each assessment follows. A copy of each technical report is attached to, and these reports form part of, this application.

Chapter 8 of this report sets out the framework by which the environmental effects (as identified in the technical reports and summarised below) of the Project will be mitigated or managed, including through suggested consent conditions.

## 7.3 COASTAL PROCESSES

This section discusses the potential effects of the proposed runway extension on coastal processes, specifically hydrodynamics, sediment transport, morphological effects, and associated impacts on surf quality. The information contained in this chapter is based on the following technical reports:

- Technical Report 11 – DHI Surf Break Impact Assessment
- Technical Report 15 – NIWA Coastal Processes Assessment
- Technical Report 16 – NIWA Marine Sediments and Contaminants (Lyllall Bay)
- Technical Report 17 – NIWA Coastal Hydrodynamics and Sediment Processes in Lyllall Bay

Where coastal processes have the potential to impact on other aspects of the environment, these effects are discussed in the relevant section of the AEE. In particular:

- Effects on coastal marine ecology (Section 7.4);
- Recreational effects (Section 7.13).

### 7.3.1 Existing Environment

#### ***Existing morphology and coastal processes***

Lyllall Bay is a semi-circular, open bay located on the Wellington south coast, between the rocky headlands of Te Raekaihu to the east and Hue te Taka (Moa Point) to the west. Lyllall Bay is exposed to a strong southerly swell from the Cook Strait.

The seabed bathymetry surrounding the existing runway and breakwater is dominated by the submerged extension of the former rocky reef (that was partially reclaimed to form the existing runway) and gravelly deposits. The remainder of Lyllall Bay is largely comprised of surface sediments of fine sand (median size of 0.15mm) or rocky platforms along the periphery of the outer bay. To the east of the existing runway (Moa Point Beach), coverage is comprised of sand with a coarse surface veneer of pebbles. The relatively shallow beach sand cover rests upon an underlying rock platform.

The morphology of Lyllall Bay is largely been shaped by sequences of seasonal (winter) southerly wave events resulting in the temporary landward retreat of the shoreline with the removed sediment forming an offshore sandbar. This process generally reverses in the summer, with traditionally, northerly dominated weather patterns.

The morphology has also been influenced by the introduction of physical structures which have influenced the coastal processes occurring within the bay. Specifically, the existing runway has influenced hydrodynamic processes within the eastern portion of the bay and a historic seawall located along the back of Lyllall Bay Beach has permanently fixed the coastline, impacting on natural beach processes.

The tidal range for Wellington is relatively low compared to the rest of New Zealand, with an average tidal range of 1m. Only 11% of the water volume of Lyall Bay is exchanged on an average tide. Tidal currents are therefore particularly weak (to negligible) within the inner confines of the bay. Predominant winds comprise southerly and northerly flows, with an average wind speed of 27km/hr (based on the Airport weather station record). Southerlies can generate a substantial wind sea which is usually accompanied by large swell resulting from the long fetches to the south. By contrast, local sea conditions generated by northerlies is severely limited by the short fetch available.

### ***Surf Conditions***

Within Lyall Bay are a number of surf breaks that provide for a range of surfing abilities. To the west of the existing runway and north of the breakwater, a shoal has formed where the underlying bathymetry has accreted. These conditions have resulted in a surf break known as “The Corner”, which provides good quality surfing waves under certain conditions. “The Corner” is considered to be a reasonably consistent, left hand surf break considered to be suitable for intermediate level surfers. Without the existing runway breakwater, “The Corner” would not exist in its current form.

“Airport Rights” is another surf break whose presence is a result of the existing runway extending into Lyall Bay. Located off the southern end of the runway, the surf only breaks in very large swell and is for expert level surfers only. This break typically produces a short ride which ends in a powerful closeout.

The remainder of the bay is made up of average beach breaks, the quality of which is dependent on variable sand banks within Lyall Bay. These breaks are typically good for surfers of all levels. For this reason, Lyall Bay is considered a nursery surf break where people of all abilities can surf.

### ***Stormwater Discharges***

Lyall Bay receives stormwater through a number of shoreline outfalls located at Lyall Bay Beach, Moa Point and near the breakwater at the south end of the existing runway. The outer bay also receives wastewater discharges from the Moa Point Wastewater Treatment Plant. Despite this, water quality is generally very good with respect to aesthetics and human health, with contaminant concentrations in surficial sediments found to be very low and uniformly distributed.

## **7.3.2 Assessment of Construction Effects on Coastal Processes**

Construction activities have the potential to impact on coastal processes within Lyall Bay. Two construction phases of this Project have been identified as giving rise to coastal effects, specifically:

- The discharges arising from the placement of rock dyke and decant water from the infill operations for the embankment within the rock dyke; and
- The disturbances of the seabed in the CMA from ground improvement activities.

The following section assesses the effects of these two activities, and is based on the construction methodology described in Chapter 4 and Appendix L of Technical Report 7 (Concept Feasibility Report). The effects associated with the occupation of the seabed and associated reclamation work has been addressed separately Section 7.3.5.

### 7.3.2.1 Turbid discharges from the infill operations

During the construction of the proposed runway extension, dewatering discharges during the embankment fill phase have the potential to introduce high-turbidity plumes into the receiving waters of Lyall Bay. The main source of turbidity in the water column would be from any fine sediments (clays, muds, silts) present in the fill material.

During the placement of gravel and rock layers (for the rock dyke), any fine materials will be winnowed largely by waves (with currents being generally slow) from the surface of the gravel and rocks, or from the general fabric of the coarse material as placed in-situ. This will generate a turbid fringe around the perimeter of the worked sections of the dyke, but are likely to be localised, occur mainly during wave events when the natural turbidity levels are higher, and once winnowed from the filter material, would be unlikely to form a persistent source of high turbidity.

For the main infill operation (associated with the reclamation), outlet weir(s) or pumped outlets are likely to be formed in the rock dyke for the removal of decant water from the reclamation as the filling progresses. Discharge locations will most likely be on the west side of the rock dyke at the northwest (NW) or southwest (SW) corners, with a third discharge point in the centre of the southern terminus rock dyke.

In order to determine an appropriate mixing distance and turbidity limit, the potential dispersal footprint of suspended sediment discharges from two decant outlet options during the fill construction phase were generically modelled. The decant water may either be saltwater from pumped, dredged or barged fill slurries, or freshwater derived from rainstorms on the infill area, or a mixture of both. To cover these various scenarios, the sediment laden discharge in the dispersion model simulations was placed in the surface (top) layer in the model, and both a continuous (e.g. from filling) and a pulsed discharge (e.g. from rainstorms) were stimulated. The model was used to generate generic sediment plume simulations that reached two different environmental turbidity limits within 100 – 150m of the discharge outlet.

The modelling has shown that of the three discharge locations, the discharge at the NW location has the most effect on inner Lyall Bay due to its closer proximity, but SSC would only reach a maximum of <3 mg/L and 6 – 8 mg/L above the background SSC for sediment discharges of 1 – 2kg respectively, based on a 30 day simulation with high wind events. Conversely, a sediment discharge at the southern terminus of the rock dyke would have a negligible contribution to turbidity levels in inner Lyall Bay, but would generate higher SSC in the Moa Point Beach area and associated fringing reefs, with highest values during calm conditions and lowest during a southerly wind event.

The modelling has also determined that a mixing distance of 150m from the discharge point is deemed to be a reasonable mixing length and pragmatic distance offshore from

construction activities and barge/vessel movements, where compliance should be determined via monitoring turbidity levels. The recommended turbidity levels are described in Chapter 8. The following table shows the maximum predicted SSC above background levels after such reasonable mixing occurs:

**Table 7-1: Maximum Predicted SSC Above Background Levels.**

SSC (mg/L) Above Background at ~150m			
Sediment Discharge	NW Discharge Site	SW Discharge Site	Centre Discharge Site
1kg/s	13 – 15	13 – 14	11 – 13
2 kg/s	32 – 34	21 – 22	22 - 23

### 7.3.2.2 Releases from disturbances from the initial seabed activities

Disturbances of the seabed in the CMA will occur from construction activities, including:

- Temporary mooring buoys and potentially structures. The final form of these structures will be developed through detailed design of the Project and it is possible that further resource consents may be required.
- Drilling and installation of stone columns or other similar in-ground strengthening works.
- Subgrade preparation for the rock dyke and placement of the rock apron on the seabed; and
- Protection and/or relocation of the ocean outfall from the Moa Point Wastewater Treatment Plant.

These activities have the potential to create localised disturbance and suspend fine-grained seabed sediments (sands will quickly settle out) and any resident low-level contamination present in the seabed sediments, leading to turbidity plumes.

Construction of temporary marine structures will involve pile driving activities that will impact a small footprint of the seabed that is unlikely to cause turbidity plumes. Stone column installation typically uses a vibrating probe with compressed air that may result in some turbidity issues; however, as the sediments are primarily sands and gravels, the sediment releases are anticipated to be minimal. The outfall protection work and construction of the rock dyke will cause localised disturbances to the seabed. Potential mitigation measures to minimise turbidity plumes include deploying silt curtains around the working areas of the marine equipment, using construction equipment and methodologies that minimise excessive disturbances of the seabed, and using clean stones/rock for the stone columns and rock dyke.

### 7.3.2.3 Contaminants

Contaminant concentrations in Lyall Bay surficial sediments are low and uniformly distributed across the proposed runway extension site. Mobilisation of near-surface sediments from within the area of the proposed runway extension is not expected to result in any significant increase in sediment-contaminant concentrations in surrounding areas. From a contaminant perspective, the risk of adverse effects on the

water column from transient sediment suspension/disturbance events during construction is very low, given that the water column concentrations, even after allowing for reasonable mixing, are estimated to be at least two-orders of magnitude lower than default ANZECC water quality trigger values.

Notwithstanding this, erosion and soil control measures will be built into the construction methodology that will further reduce the environmental risk from seabed disturbances.

### **7.3.3 Assessment of Operational Hydrodynamic Effects**

#### **7.3.3.1 Assessment of operational tidal and wind driven current effects**

Due to its further extension into Lyall Bay, the proposed runway extension will partially impede current flows, potentially affecting local circulation.

Hydrodynamic modelling undertaken by NIWA has assessed the comparative pre and post runway extension effects on tidal and current flows. This modelling approach was adopted to assess the relative change arising as a result of the Project.

#### **7.3.3.2 Tides**

Within Lyall Bay the tidal current models were very weak both for the existing and proposed runway extension simulations. Consequently, the proposed runway extension is considered to have negligible effects on tidal currents (excluding currents generated by the wind).

#### **7.3.3.3 Residual circulation (winds and tides)**

Residual or net current circulation is the current pattern remaining after the to and fro tidal and wind generated movements have been averaged out.

The modelled residual (net) circulation within Lyall Bay before and after the runway extension shows the existence of two weak residual eddy-like circulation patterns.

In the mid-section of the bay (up to the end of the present runway), the modelling demonstrated a residual anti-clockwise circulation (towards Moa Point and the eastern shoreline before turning west at the end of the present runway). The introduction of the proposed runway extension was shown to partially interrupt and re-direct this westerly net flow inshore, creating two calmer zones with negligible net currents either side of the proposed runway extension. While less general flushing would be anticipated as a consequent of these changes, particularly to the east of the runway, the bay remains open and exposed to waves, therefore the effect on coastal physical processes would be minor.

Further inshore, a weak residual clockwise pattern occurs generating a generally north-eastwards flow in the nearshore area towards “The Corner” and a subsequent southwards flow along the existing runway embankment. Combined with diffraction around the breakwater, the gradual north east flow partially explains the overall seabed accretion that has occurred on the eastern side of the bay adjacent to the runway. The modelled effects of the proposed runway extension on this inner bay circulation cell (near the foreshore) will be negligible.



The strong ebb-tidal currents that enter the bay and exit back out to Cook Strait remain unchanged under the pre and post extension scenarios modelled.

#### 7.3.3.4 Strong wind current circulation

Relative to tidal currents, substantial wind driven currents can be generated within Lyall Bay, especially during strong winds.

To investigate wind driven circulation inside Lyall Bay, a time series of idealised northerly and southerly directed winds peaking at 80km/hr was modelled for both the existing and proposed runway extension scenarios, and was superimposed on a repeating average lunar tide cycle to ensure the modelling focussed on wind circulation.

During strong southerly winds under existing conditions, the most intense wind driven currents flow north (downwind) in the shallow water along the western and eastern shores of Lyall Bay. The currents then flow clockwise from the head of the bay, and converge with a counter-clockwise eddy that extends from the eastern shore of the outer bay at Moa Point and westward across the end of the existing runway out into the central bay. A comparative assessment of the pre and post runway extension works suggests that there is likely to be only localised effects on the wind generated current flows during southerlies, including the localised re-steering of the downwind flow along the eastern bay and slightly faster velocities across the end of the proposed runway. The stone blanket on the seabed around the proposed runway extension will preclude any mobilising of seabed sediments due to the slightly higher wind generated current.

During strong northerly conditions, the most intense wind-driven currents flow south in the shallow water along the periphery of both the western and eastern shores of Lyall Bay. The downwind outflows cause waters to be drawn in from Cook Strait through the central bay. At the head of Lyall Bay, the inflowing water then bifurcates and forms a dipole circulation. A counter clockwise flow on the western side and a clockwise flow on the eastern side of the bay results.

The eastward flows into “The Corner” is the same for both a southerly and northerly wind flow, likely contributing to the seabed accretion in this area.

The Delft2D model simulations indicate that there would be little change in Lyall Bay wind-driven circulation during strong northerly winds, other than minor localised changes around the runway embankment area. Circulation during northerly winds would remain largely unaffected in the bay by the proposed runway extension.

#### 7.3.4 Assessment of Operational Wave and Swell Effects

A comparison of pre and post runway extension wave heights have been modelled within Lyall Bay and is described in detail in **Technical Report 15**.

Site specific modelling of eight locations within Lyall Bay demonstrated that the main changes in wave height were located downstream of the proposed runway extension, with smaller changes in wave heights across the wider inner bay for wind-waves but less so for swell.

Results from modelling the before and post construction situation demonstrate that the proposed runway extension has the potential to generate adverse effects on some combinations of wave heights and periods in some parts of the bay, mainly on the eastern side of Lyall Bay near the existing runway embankment and more localised effects along the western and eastern side of the proposed runway extension.

The largest modelled reduction in wave height overall was shown to be located adjacent to the west side of the proposed runway extension, as the wave peels along the western side of the extension. Friction exerted by the accropode units and also by the slight sheltering effects of the proposed runway extension alignment (being slightly west of the predominant wave approach from the south) serve to dissipate the waves through this area. In “The Corner”, wave height could be reduced by approximately 0.2 to 0.4m for a 1.5m incident wave. Conversely, a localised increase in the 8 second wind waves were observed immediately behind the breakwater due to diffraction.

The cove east of the runway will also exhibit a reduction in wave height, with more resonant or wave sloshing behaviour likely after the extension has been constructed.

A slight increase in wave heights was modelled around the breakwater, the narrow central component of the inner bay of the main beach and at an area close to the eastern end of the bay near “The Corner”. The latter is due to reduced wave heights offshore from this part of the beach, with waves able to propagate slightly further inshore than is the case for the existing situation.

The height of the wave trains reaching the central part of Lyall Bay Beach are likely to only be slightly affected by the proposed runway extension, otherwise elsewhere in the bay, including the western side, the changes will be negligible.

The recreational implications of the changes are discussed below in Section 7.3.6 relating to effects on surfing quality and safety of recreational users.

### **7.3.5 Assessment of Operational Sediment Transport and Morphological Effects**

#### **7.3.5.1 Short to season timescales**

Sand transport in shallow coastal areas is a complex interaction between waves, which primarily re-suspend seabed sediments into the water column, which are then subsequently transported by currents until the sediment particles settle again. In nearshore waters, including the surf-zone, non-linear wave dynamics can also transport re-suspended sediments, especially if waves propagate towards the nearshore zone at an oblique angle to the beach.

Introducing waves as well as tide and wind-driven forcing into a sediment-transport model, shows the predicted net change in seabed heights following the construction of the proposed runway extension. Over seasonal timescales, the model showed that the changes would be no more than minor (<1 cm) over much of Lyall Bay, including the nearshore area off Lyall Bay Beach and the eastern cove. The morphology of Lyall Bay Beach will still be dominated by cut and fill along an on/offshore seabed profile

governed by southerly storm events, with any effects of the proposed runway extension on seasonal morphological timescales likely to be second-order influences.

Modelling demonstrated that the predicted net change in seabed heights are likely to be small, particularly within the inner Lyall Bay, the main beach, the eastern cove and the areas along the western and eastern perimeter of the bay. Localised changes within 50m of the proposed runway extension are likely to be observed where the existing sea bed has to adjust to the presence of the rock dyke and the associated wave interactions. Morphological adjustments will result off the end of the proposed runway extension through some erosion of sand seaward of the rock apron, adjacent to the rock/acropode dyke, and deposition of the sand further offshore, until a new equilibrium seabed profile is established. This is likely to be a “dynamic equilibrium” which is contingent on seasonal weather conditions and swell frequency or persistence.

The sediment-transport model predicted that there may be some localised deposition on the SW and SE corners of the dyke under the seasonal time scales and environmental conditions that were simulated. Over much longer periods, varying seasonal weather conditions and swell frequency may re-mobilise and move such sand deposits next to the proposed runway extension given the high wave exposure of this area. The response of the existing runway revetment is positioned over an area of submerged rock outcrop, therefore the existing in-situ morphological analogue of the local seabed response has built up over decades and is not easily transferable to the seabed of the extended runway dyke where mobile sand cover will be present without surface rock outcrops. Any resulting scour effect of the structure can be managed by transition to natural seabed with a rock blanket in front of the rock dyke.

### 7.3.5.2 Long term morphological effects

Other than a limited study undertaken in 1979, there have been no routine beach profiles monitoring of Lyall Bay Beach from which to understand the long term morphological response of Lyall Bay to the existing runway. For assessing any changes to longer term beach-nearshore morphology, it is not feasible or meaningful to scale up the sediment–transport and morphology model results to longer timescales than seasonal without having the benefit of a multi-year beach profiling dataset for Lyall Bay. The long term morphological response of Lyall Bay to climatic cycles such as El Nino-Southern Oscillation episode and longer 20-30 year Pacific-wide climate cycles is also largely unknown.

The likely long term effects of the proposed runway extension in deeper water has been assessed however, based on both the existing analogue of the present runway embankment, the associated breakwater still has the dominant control on nearshore morphology on the eastern side of the inner bay, along with the wave and morphological model results for seasonal timescales.

Based on the limited beach-profile dataset from 1979, seabed height variability largely occurred within about 600m of the shoreline. This indicates that any morphological effects of the proposed runway extension will likely be driven by changes in waves and currents northwards of the existing breakwater and associated submerged rock outcrop. The wave modelling has demonstrated that the existing breakwater is acting

as a critical hydraulic control on wave refraction and diffraction processes north of the structure, and to some extent, on current flows.

Within the nearshore zone of Lyall Bay Beach, the predicted wave patterns for the pre and post runway extension show a largely similar overall spatial pattern for wave refraction and diffraction, albeit with reduced wave heights on the eastern side with the proposed runway extension. The gradual shoaling of the north east corner of the bay arising from the existing runway and breakwater (which govern the current wave climate in “The Corner”), is therefore likely to continue with only minor effects from the proposed runway extension further offshore.

To provide more quantitative information on how the nearshore morphology responds to storm sequences, a fixed-term beach-profile monitoring programme could be implemented for a period of a few years. Because of the dominant response of the nearshore-beach system to natural climate variability and southerly-storm sequences, it would be difficult to isolate the effect of the proposed runway extension (in deeper water beyond the breakwater) from the ongoing morphological response associated with the existing runway and breakwater and the seawalls that limit the back-beach response along Lyall Bay Beach during storm-cut cycles. However there may be some merit in undertaking future high-resolution multi-beam bathymetric surveys in the eastern sector in the inner Bay, building on, and comparing with, the 2014 survey by NIWA.

A preliminary assessment of the potential impact of the proposed SWFS on the Lyall Bay shoreline has been undertaken. The results of this assessment are discussed later in Section 7.5.

### 7.3.6 Assessment of Effects on Surf Quality

Using the results of NIWA’s investigations (**Technical Reports 15 and 17**), DHI has undertaken numerical modelling to assess the impact of the proposed runway extension on the wave climate, swimmer safety and surf quality of the surf breaks at Lyall Bay. A full copy of their assessment is contained in **Technical Report 11**.

#### 7.3.6.1 Establishing surfable days

To provide a realistic quantification of the frequency and distribution of surfable wave conditions in Lyall Bay, surf criteria were established. The following minimum surf characteristics were developed to define “good” surf conditions:

- Minimum significant wave height ( $H_s$ ) of 0.8m;
- Minimum spectral peak period ( $T_p$ ) of 11 seconds (s) between waves;
- Wind direction originating from the north (90) or wind speed must be less than 6m/s;
- The event must last for a minimum of two consecutive hours;
- The event must occur between the hours of 6am and 6pm.

“Very Good” conditions were defined using the same criteria albeit with a significant wave height of 1.5m. Surf conditions outside of the above prescribed criteria are not considered to be representative of quality surfing conditions.

Applying the aforementioned conditions to wave transformation studies and wind measurements from Wellington Airport’s weather station (from 30 January 2014 to 17 February 2015), the proportion of surfable wave conditions over a 365-day period was estimated for Lyall Bay. Out of a total of 365 days, 125 days (or 34%) fulfilled the minimum criteria for “good surf” conditions, or two to three days per week. Very good surf conditions occurred approximately 10% of the time, or 3.2 days per month.

### 7.3.6.2 Modelling Scenarios

To investigate the effects of the proposed runway extension on surf quality, modelling was used to quantify key surfing amenity quality parameters, including:

- Number of surfable waves
- Wave face height
- Wave length
- Wave peeling velocity.

Drawing on available meteorological and wave data and input from the surfing community, a model was developed and run for three separate surf events that occurred in 2014 to determine the pre and post runway extension effects on surf quality. These included an event on 1 June 2014 that was considered to be representative of common good surf conditions in Lyall Bay (Scenario 2), and two larger events that occurred on 4 March 2014 (Scenario 3) and 9 September 2014 (Scenario 1) that were considered representative of large swells of high quality and of importance to the surfing community.

For the purposes of modelling, a surfable wave was defined as having a minimum ride length of 50m and a minimum face of 1m for common surf conditions (Scenario 2). For larger wave events (such as Scenarios 1 and 3), the modelled face was 1.8m and 2.0m respectively. For the purposes of the following assessment, Lyall Bay has also been separated into three inshore areas – “The Corner”, “Middle Beach” and “Western Beach”. A fourth area known as “Airport Rights” is also considered.

### 7.3.6.3 Surf quality effects

#### *The Corner*

Modelling of the surf break known as “The Corner” predicts an increase in the ride length and a small decrease in the total number of surfable days following the completion of the proposed runway extension (refer to **Table 7-2**). The small 4 to 8% reduction in surfable rides at this break is considered to be a consequence of wave quality at this site being governed primarily by the diffracted wave field that extends from the rock formation beneath the breakwater.

**Table 7-2: Post construction changes to “The Corner” under three modelled scenarios.**

Surf Spot	Change in Wave Height (%)	Change in ride length (%)	Change in number of surfable waves (%)
<b>Scenario 1</b> <b>Large Event</b> <b>(1.8m face)</b>	- 1.2%	+ 0.2%	- 8.2%
<b>Scenario 2</b> <b>Common Surf Event</b> <b>(1m face)</b>	- 1.0 %	+ 4.1%	- 3.6%
<b>Scenario 3</b> <b>Large Event (2m face)</b>	- 0.3%	+ 9.6%	- 4.5%

### ***Middle and West Beach***

Due to the absence of any nearshore, rocky outcrops or reefs, the surf amenity at Middle and West Beaches is dependent of the peakiness of the incoming wave field. With a reduction in wave peakiness anticipated as a result of the proposed runway extension, a corresponding reduction of between 14-29% and 18-27% is anticipated for surf rides at Middle Beach and West Beach respectively (refer to **Tables 7-3** and **7-4**).

Modelling of both beaches did not demonstrate any substantial change in wave height as a consequence of the proposed runway extension.

**Table 7-3: Post construction changes to West Beach under the three modelled scenarios.**

Surf Spot	Change in Wave Height (%)	Change in ride length (%)	Change in number of surfable waves (%)
<b>Scenario 1</b> <b>Large Event</b> <b>(1.8m face)</b>	- 1.3%	-16.4%	- 27.0%
<b>Scenario 2</b> <b>Common Surf Event</b> <b>(1m face)</b>	- 0.6 %	- 6.3%	+ 6.7%
<b>Scenario 3</b> <b>Large Event</b> <b>(2m face)</b>	+ 0.5%	-3.9%	- 18.3%



**Table 7-4: Post construction changes to Middle Beach under the three modelled scenarios.**

Surf Spot	Change in Wave Height (%)	Change in ride length (%)	Change in number of surfable waves (%)
<b>Scenario 1</b> <b>Large Event</b> <b>(1.8m face)</b>	+ 0.1%	-14.8%	- 28.6%
<b>Scenario 2</b> <b>Common Surf Event</b> <b>(1m face)</b>	+ 0.8%	- 6.1%	- 13.9%
<b>Scenario 3</b> <b>Large Event</b> <b>(2m face)</b>	- 0.3%	+ 0.9%	- 16.1%

### ***Airport Rights***

The proposed runway extension will extend over the surf spot known as “Airport Rights”. Surfing amenity associated with this break will therefore be lost as a result of the extension works. The bathymetry south of the proposed runway extension is too deep to generate a similar surfable wave break post construction. It was therefore considered impracticable to undertake detailed modelling for this surf break.

### ***Summary of Surf Quality Effects***

Overall modelling found that the Airport runway extension would not cause a noticeable sheltering or reduction in wave height along all three modelled sites. However, the steep rock revetment was found to reduce wave refraction to the east which will reduce the overall ‘peakiness’ of the waves propagating into the middle and west sections of Lyall Bay.

For the three scenarios set out above, negative impacts are expected to be the largest for large wave periods (Scenarios 1 and 3). In order to offset or mitigate these effects a SWFS is proposed. This is described in more detail in Chapter 8.

The surfing amenity provided at “Airport Rights” will be lost.

#### **7.3.6.4 Swimming safety effects**

In nearshore areas of Lyall Bay, the overall small difference in significant wave heights and change in wave induced currents poses negligible impact to changes in swimming safety.

#### **7.3.7 Assessment of Operational Water Quality and Clarity Effects**

Local changes in waves and swell during storms around the runway extension may slightly alter resuspension of finer seabed sediments. However, turbidity increases in

Lyall Bay are usually ubiquitous during strong wind and/or wave events, therefore any localised changes in turbidity post-construction would not be detectable.

Other than minor operational stormwater discharges, the proposed runway extension will have negligible effects on turbidity and hence water quality and clarity.

### **7.3.8 Other Coastal Processes, Sea Level Rise and Climate Change Effects**

Coastal processes including storm inundation, wave forces, tsunamis and longer term from climate change will also have the potential to impact on the proposed runway extension. These aspects, aside from climate change and coastal storm inundation have been factored into the overall design of the Project, ensuring that the proposed runway extension will withstand significant wave forces.

NIWA has undertaken an assessment of the implications of the Project arising from sea level rise and climate change effects on waves and storm surges over the next 100 years.

After considering statutory planning requirements, and national and international guidelines it was considered appropriate to assess the proposed runway extension applying a sea level rise of 1.2m by the year 2115 and a 0.15m contribution for increases in waves and storm surge height induced by climate change effects. The analysis undertaken has assessed that these climate induced changes would not endanger the current runway and air side areas adjacent to the runway, and even less so for the proposed runway extension due to the finished ground levels. The southern end of the current runway is 8m above the Wellington Vertical Datum 1953 (WVD-53), or 7.8m above present MSL, which is currently at 0.2m above WVD-53. The proposed runway extension will continue an upward incline to reach a height of approximately 9m WVD-53 at the southern end.

### **7.3.9 Measures to Avoid, Remedy or Mitigate Actual or Potential Adverse Effects on Coastal Processes**

The only adverse assessed change in coastal physical processes that has been identified relates to the reduction in a combination of wave heights and period in parts of Lyall Bay, particularly in the north eastern area of Lyall Bay adjacent to the revetment, and to a lesser extent, the cove to the east of the runway. All other effects on coastal physical processes are assessed as being minor or negligible.

#### ***Discharge Activities***

The sedimentary characteristics of the fill for the reclamation will not be known until a contractor is appointed and the final methodology refined. An adaptive management approach to monitoring turbidity against the existing background limits will therefore be required to ensure water quality effects from sediment plumes are appropriately mitigated. Conditions of consent are proffered in this regard and are discussed in more detail in Section 7.4 with respect to ecological effects. Conditions include (but are not limited to):

- Best-practice construction or post-construction house-keeping. Visual observations to ensure effects are no more than minor as works proceed (especially in relation to the decant discharges during construction).
- Compliance monitoring as part of an adaptive management approach e.g., to ensure changes to turbidity (after reasonable mixing) are within acceptable limits.

### ***Changes to Physical Coastal Processes***

Post construction monitoring data, such as seabed bathymetry and beach profiles will be gathered to ensure any physical changes to the existing environment are appropriately documented and analysed.

### **7.3.10 Measures to Avoid, Remedy or Mitigate Actual or Potential Adverse Effects on Surfing Amenity**

Avoiding or reducing the effects of the proposed runway extension on surfing amenity is difficult to achieve without impacting the length of the runway extension. DHI has therefore identified a number of mitigation options that could be implemented to compensate for, or offset the predicted effects on surfing amenity in Lyall Bay and potentially improve current baseline conditions.

Preliminary investigations have identified that Lyall Bay possesses the appropriate characteristics for an artificial surf enhancing structure positioned at either the middle or west of the bay. The structure would be designed to focus wave energy towards a shoreline location, forming a local wave peak. This would result in longer waves and rides. The use of SWFS is considered to be the safest and most cost effective approach for mitigating the effects on surfing amenity and potentially enhancing it.

In order to determine the degree to which a wave focusing structure would mitigate surfing amenity effects, a preliminary design has been developed and its impacts on surf quality modelled. Modelling of such a structure for Scenario 1 (common surf conditions) predicted longer right and left hand rides with larger wave face heights in the lee of the structure. This indicates that such a structure would not only mitigate against the impacts of the proposed runway extension, but would also have potential to enhance surfing potential under common surf conditions.

## 7.4 ECOLOGICAL AND WATER QUALITY EFFECTS ARISING FROM THE PROPOSED RUNWAY EXTENSION

This section discusses the potential effects on ecological values and water quality within the CMA arising from construction of the proposed runway extension. The information contained in this section is based on the following technical assessments:

- Technical Report 15 – NIWA Coastal Processes Assessment;
- Technical Report 18 – NIWA Ecological Character Report;
- Technical Report 19 – AES Assessment of Ecological Effects

### 7.4.1 Existing Ecological and Aquatic Environment

WIAL engaged NIWA to undertake an ecological review and assessment in order to characterise the existing Lyall Bay ecosystem, including water colour and clarity, plankton, and seafloor communities, during spring 2014 – and to characterise seabirds, marine mammals, fish, and fisheries over longer periods using existing data. This report is attached as **Technical Report 18**. In addition NIWA was also engaged to assess the existing coastal hydrodynamics and sediment processes within Lyall Bay. These reports are attached as **Technical Reports 15 - 17**, and are described in more detail in Section 7.3 above.

The deployment of an optical monitoring mooring in Lyall Bay provided an assessment of the dynamics in optical water quality and estimates of total suspended sediment from turbidity over the spring month of September 2014. The deployment captured calm periods and several storm events, with corresponding reduction in visibility range and euphotic zone depth.

Plankton characteristics (phytoplankton and zooplankton abundance and species composition, chlorophyll-a concentrations) in Lyall Bay were typical of those in the Greater Cook Strait region, reflecting tidal mixing, upwelling, and stratified water conditions.

Sediments in Lyall Bay, due to its southern exposure, are dominated by well sorted fine sand. Gravels occurred only along the eastern margin.

Low particulate organic carbon (**POC**) values in Lyall Bay reflect the predominance of fine sandy sediments, the low biological infaunal biomass and the high levels of re-mobilisation of these surficial sediments by waves and tides. The overall low particulate nitrogen content and moderately high carbon to nitrogen ratios in surficial sediments, especially along the easternmost side of Lyall Bay in the area of the proposed runway extension, reflect the overall low contributions of organic matter to these sandy sediments.

The highly mobile nature of the surficial sandy sediments in Lyall Bay, and resulting low chlorophyll-a content, suggests that microphytobenthic activity is not a dominant factor on the seafloor. None of the three dinoflagellate cyst types found in seafloor sediments in Lyall Bay were produced by any of the harmful species previously identified in ports and harbours of New Zealand.

The soft-sediment seafloor communities assessed in Lyall Bay are typical of those found along Wellington's south coast. There is low overall abundance and species richness of epi- and macro-infaunal communities, most likely reflecting the exposed nature of this environment. Video imagery suggests that ghost shrimp, *Biffarius filholi*, comprise the bulk of the macro-infaunal biomass in the shallow half of Lyall Bay.

Meiofauna was the most abundant component of the soft sediment community in Lyall Bay with densities close to the average values reported for this type of habitat. The community was dominated by nematodes and harpacticoid copepods, and somewhat unusually, by kinorhynchans and tardigrades at some sites.

Apart from the areas of artificial substrates, especially in the intertidal and shallow subtidal zones, the rocky reef communities assessed in Lyall Bay are typical of shallow reef habitats along the Wellington south coast. They support a rich and diverse range of brown, red and green macroalgae which not only are key contributors to coastal ecosystems through the energy captured via photosynthesis, but they also provide highly structured three-dimensional habitats critical for other grazing and predatory reef species, some of which are valuable food organisms such as paua, kina and rock lobsters, as well as a range of reef fish. Compared to a longer term, wider area, survey of intertidal rocky reef communities on Wellington's south coast, the intertidal rocky reef communities in Lyall Bay sampled during this study can be expected to reflect the annual average for this site.

Lyall Bay has a moderately diverse reef fish fauna with only 27 of the 72 species modelled New Zealand-wide, predicted to occur on reefs within SCUBA diving depth range. None of the modelled species are nationally threatened. There was good agreement between the reef fish species observed by divers during algae and invertebrate counts and the modelled species predicted to be most common in Lyall Bay<sup>37</sup>.

Forty-four demersal species are predicted to occur in Lyall Bay but only 11 species are likely to be common. The 11 species likely to be commonly found in Lyall Bay are barracouta, blue cod, leatherjacket, lemon sole, red cod, spiny dogfish, spotty, silver warehou, tarakihi, common warehou, and witch. No species is confined to Lyall Bay and all species are ubiquitous throughout the region.

Of the New Zealand total of seabird species at least 26% occur in the Cook Strait region, while for marine mammals at least 17% occur in the region. However, only a relatively small sub-set of seabird and marine mammal species occurring in Cook Strait have been recorded in Lyall Bay close to the southern end of the Airport and there is little, if any, evidence to suggest these areas are important for seabirds and marine mammals, either as breeding sites or feeding zones. While blue penguins breed along the south coast of Wellington including the Moa Point area, it is considered unlikely this species breeds in the rock wall to the south of the Airport as the exposure to wave action here would be relatively high.

<sup>37</sup> It is noted that the modelling of fish distributions and abundance is based on a very large and comprehensive data set of diver observations and trawl surveys.

Overall it has been assessed that Lyall Bay comprises three main habitats; the water column pelagic environment, sandy seafloor sediments in the main part of the bay, and rocky reefs around the bay's eastern and western margins. It has been assessed that the fauna and flora associated with these habitats in the area potentially affected by the proposed runway extension are typical of that in adjacent habitats in Lyall Bay, which in turn are typical of those along Wellington's south coast. The potentially affected areas in Lyall Bay are therefore deemed to not be critical habitat for any threatened or rare species.

The only commercial fisheries known to operate near Lyall Bay are rock lobster potting and set netting for butterfish, and these are confined to the headlands at Moa Point on the east and Te Raekaihau Point, adjacent to the Te Taputeranga Marine Reserve boundary, on the west.

In contrast, it is recorded that recreational fishing does occur in the area potentially affected by the proposed runway extension. Rod and line fishing from the shore frequently occurs in Lyall Bay, particularly from the existing breakwater at the south west corner of the existing runway, and hand-gathering of paua, kina, and rock lobsters occurs from the reefs at the southern end of the runway. Recreational set netting, probably for butterfish, occurs around the south eastern entrance to Lyall Bay south of the Airport.

#### 7.4.2 Methodology

The assessment of effects of construction of the proposed runway extension on the marine environment needs to be based on a good understanding of the existing biological resources, the type of construction activity and sensitivities of the biological communities to those activities. The ecological effects associated with construction of the proposed runway extension are likely to be short term and mostly associated with temporary disturbance of the seabed and the potential production of turbid plumes from dewatering discharges which could impact beyond the immediate area. The actual or potential effects arising from construction activities on ecological and biological resources within the CMA have been identified as:

- Physical disturbance and loss of habitat;
- Changes in water quality through the disturbance of the seabed and potential introduction of contaminants within the fill;
- Increases in suspended sediments and turbidity of the water column during construction of the dyke and from dewatering discharges;
- Sedimentation of material in suspension;
- Release of contaminants, such as heavy metals, during disturbance of the seabed and potentially from the fill; and
- Noise from drilling and blasting activities.



The evaluation of the impact of these activities that has been undertaken by AES and NIWA (**Technical Reports 18 and 19**) has taken into account the severity, the short term and long term effects that may occur both at the immediate site of construction (near field) and the surrounding area (far field).

Near field effects are defined as “phenomena occurring within the geographic bounds of the activity, or less than approximately 1km from the activity”. For reclamations such as is proposed, near field short term effects include disturbance of the benthic habitat, loss of habitat and communities in the area, increased turbidity and potential for smothering of organisms nearby, reduced faunal densities/biomass and diversity, potentially reduced water quality in the immediate area arising from the potential contamination and release of sediments during construction.

Generally, far field effects associated with reclamation projects which are defined as “occurring more than approximately 1km from the activity”, are not expected to be significantly adverse in the short or long term, but there can be dispersal of some fine sediments that can impact on biota, and changes to geomorphology and hydrodynamics at the wider bay scale. These latter considerations have been assessed by NIWA as described in Section 7.3 and in detail in **Technical Reports 15 - 17**.

For the purposes of this AEE the effects have been assessed within and beyond 200m and 500m area of the reclamation site.

### 7.4.3 Assessment of Effects – Physical Disturbance and Loss of Habitat

The proposed runway extension will require the occupation and reclamation of an area of the CMA. Inevitably this results in the loss of intertidal and subtidal habitat of an area of approximately 10.82 ha (including toe of the reclamation). This habitat loss will include soft bottom and reef habitat and the biota that currently exists within this area.

#### 7.4.3.1 Habitat Loss

The area of soft (sand and gravel) habitats likely to be permanently lost to the reclamation is approximately 5.9 ha, representing about 3% of the area of soft sediments in Lyall Bay which is not considered to be significant. The area of subtidal reef likely to be lost to the proposed reclamation activities is about 5.3 ha. This comprises 5% of the 99 ha of subtidal rocky reefs in Lyall Bay and 1.5% of the 328 ha subtidal rocky reefs along Wellington’s south coast from Sinclair Head to the point at the northern end of Breaker Bay. The length of existing coastline bordered by intertidal rocky reef that will be buried during the runway construction will be 0.28 km, with much of it comprised of artificial substrates including accropodes, concrete blocks, concrete tiles and clay bricks. This comprises 7% of the 4 km of coastline bordered by intertidal reefs in Lyall Bay and 2% of the 15.7 km of coastline bordered by rocky reefs along Wellington’s south coast. However the proposed rock dyke will provide a reef area of approximately 2.7 ha along a length of about 920m of coastline. The net loss of subtidal reef area to Lyall Bay and to Wellington’s south coast will be 3% and 1% respectively. The net gain in coastline bordered by intertidal reef will be 0.6 km, a 16% increase for Lyall Bay and 4% increase for Wellington’s south coast. Overall the loss of area or length of reef habitat in terms of actual or net loss is considered to be no more than minor.

#### 7.4.3.2 Reef Communities

The assessments determine that no rare or unique species or assemblages will be lost and the communities are typical of the south Wellington coast. The only species of significance found was an undescribed red algae which is known from other parts of New Zealand (e.g. Otago) and may be more widespread but has not been recorded. Some of the reef communities that would be lost in the immediate vicinity would be at least partially offset by the development of rock wall communities around the reclamation.

#### 7.4.3.3 Birds and Mammals

In the context of the use of Lyall Bay and the area of the proposed runway extension, the construction activities may temporarily disturb seabirds and marine mammals, and could potentially cause localised displacement of mammals to adjacent areas or potentially result in these species moving further afield out of the Lyall Bay – Moa Point area. Noise arising from the construction activities could also potentially affect marine mammals and seabirds that forage within the water column (blue penguin and shags).

If any breeding blue penguins are within the vicinity of the construction area, these could be disturbed to the extent that breeding is deferred, abandoned or breeding birds move to areas away from the construction area. These effects would be temporary, however there is a risk that any displaced breeding birds may not return to the area and it may take a number of years to recruit to the breeding population and occupy areas formerly used by breeding birds. It is however considered that the number of blue penguins affected by this would be very small, and any such effects would be insignificant at an overall population level.

Most shore and seabirds and larger marine mammals will forage over a large area and there is no evidence that the area of the proposed runway extension is particularly important to any species.

#### 7.4.3.4 Fish

The loss of reef habitat as discussed above for fish species, is not considered to be more than minor in the overall context of Lyall Bay and wider south coast of Wellington. A 300m exclusion zone around the construction zone will be in place for the period it takes for the proposed runway extension to be completed. This is not likely to affect any commercial fisheries as none operate within this distance of the present southern end of the runway. However, some recreational and customary fishing activities will be affected on a temporary basis.

Post-construction recovery of specific reef groups will vary. Emigration from surrounding habitats to the rock dyke is potentially high for a range of fish species which also occur in the demersal soft sediment habitats in Lyall Bay. For reef obligate species development of populations on the rock dyke will be principally from settlement of post-larvae, and their subsequent survival and growth to mature sizes. This will take a number of years.

As emigration from other reefs is highly unlikely, the development of fishable paua and kina populations on the rock dyke will be principally from settlement of post-larvae, and

their subsequent survival and growth to legal sizes. This may take 10 or more years for paua. However, it possible to hasten this process by enhancing the population on the rock dyke by 'out-planting' juvenile paua raised in captivity from locally sourced parents. Rock lobsters are large and mobile and can move long distances across open seafloor habitats, thus their emigration from other reefs in Lyall Bay to the rock dyke is highly likely to occur soon after construction is completed. The provision of suitable sized holes on the accropodes for puerulus larvae and small juveniles has been recommended in order to help initiate the recovery of rock lobster populations in the area.

#### **7.4.4 Assessments of Effects - Water Quality and Contaminants**

Contaminants released from benthic sediments during the construction of the proposed runway extension could potentially bioaccumulate and become concentrated in species at the top of the food chain (e.g. large benthic fauna like cockles and eventually large fishes, birds and mammals). In turn this could potentially affect human health if contaminants reached certain thresholds (due to seafood being consumed).

The sediments in the area are however assessed as being very low in contaminants, low in organic content and particulate nitrogen, and is likely to be very low in other nutrients. Contaminant concentrations are recorded as being at least two orders of magnitude lower than default ANZECC guideline values. As the existing contaminants levels are low and evenly distributed, the risk of adverse effects from the disturbance of the seabed is therefore assessed as being negligible. The potential for contamination arising from imported fill to construct the reclamation is also assessed as being low.

##### **7.4.4.1 Suspended Sediment and Turbidity**

During the temporary construction phase, disturbances of the seabed, and dewatering discharges from the reclamation infilling could result in the release of fine sediments into the water column. This in turn could have effects on plankton and fish in the water column, benthic biota and reduced light levels, which can impact on benthic and pelagic algae and plants and foraging seabirds.

The potential effects arising from suspended sediments are identified as:

- A reduction in water clarity and possible conspicuous changes in colour;
- Increases in suspended sediments and turbidity in the water column;
- Impacts on physiological processes of benthic fauna, such as feeding and respiration;
- Reduced primary production by benthic and planktonic algae and macroalgae;
- Reduced clarity for visual feeders such as birds and some fish; and
- Effects on fish and birds through reduced prey and food resources.

The level of impact from suspended sediment and turbidity of constructing a reclamation will largely depend on the nature of the material to be used for infilling (sediment type, percentage of fine-grained sediments, degree of organic enrichment,

presence of contaminants), and the seabed characteristics of the area underlying the reclamation. While the latter are well understood, the exact nature and source of the fill material is not able to be defined as it may change depending on the contracting tender process. Given there is no specific information of the duration and persistence of dewatering discharges, nor the percentage of muds and silts in the fill material, NIWA, in consultation with AES, has modelled the dispersal footprint by iteratively changing the sediment-source discharge (kg/sec) of medium-silt material until two different ecological SSC<sup>38</sup> limits (25 mg/L and 40 mg/L) were nominally reached at around 100–150m from the discharge point (after allowing for reasonable mixing). Three discharge locations (D1 to D3) around the rock-dyke were modelled to cover different possible locations the contractor could use.

#### 7.4.4.2 Effects of Suspended Sediment on Benthic Communities

Increased levels of suspended sediments and turbidity could impact on benthic communities through direct physical effects and indirectly through changes to water clarity and light availability. These direct physical effects on benthic animals include clogging of gills, and impairment of respiration and feeding via filtration, in the affected areas nearby. Suspension feeding animals such as some polychaete worms, cockles and mussels, can also be vulnerable to high sediment levels and persistent high turbidity can result in changes in assemblages from dominance by suspension feeding taxa to ones dominated by deposit feeders. Impacts of increased turbidity are likely to be greatest in low energy areas where water exchange and wave action are limited. In the case of the proposed runway extension the small cove to the east of the reclamation site could be such an area, at least for a short period before the next major wind and wave event.

Based on the data obtained from the optical mooring deployed in outer Lyall Bay, existing SSC ranged from 0.3 to 16 mg/L at the more relevant upper sensor (8m depth) – particularly if turbidity monitoring buoys are to be used. During the five-week monitoring period there were a few events associated with higher waves (southerlies) where SSC was above 5 mg/L for around two to three days at 8m below the surface (exceeded 13% of the time during the monitoring), with a peak recorded just over 16 mg/L. However, SSC is likely to be considerably higher within inner Lyall Bay, due to more dynamic wave conditions at the seabed and the influence of any coincidental stormwater discharges.

Therefore most benthic communities therefore that exist within the bay are adapted to episodic periods of higher turbidity for a few days. The predicted maximum increases in SSC arising from the reclamation construction discharges, beyond a mixing area of 150m, is likely to be no more than 11–15 mg/L above background levels (depending on the discharge location) for a 1 kg/s sediment source of medium silt, rising to maxima of 21–34 mg/L (at discharge site D1) above background for twice the discharge (2 kg/s). However, during strong wind events (southerly or northerly), the modelled plume simulations show a lower SSC above background levels from the dyke discharge would occur within several hundred metres of the discharge due to increased mixing by wind-generated currents. The flipside of increased dispersion during high wind events also means that the sediment plume would disperse further afield than

<sup>38</sup> SSC = suspended sediment concentration (equivalent to TSS), commonly used in the context of sediment modelling or marine ecological thresholds.

during calm conditions (due to the stronger currents), albeit at low concentrations of around 1–4 mg/L above background, which would not occur otherwise in calmer less dispersive conditions.

Further, during strong southerly wind or swell events, while the contribution from a discharged sediment plume from the dyke reduces (due to increased dispersion), the background SSC is elevated substantially, so the absolute SSC or turbidity (irrespective of the background level) needs to also be considered when setting an environmental turbidity limit (**ETL**). For the existing conditions, occasional elevated SSC to 16 mg/L or more (and higher to 37 mg/L or more at 16m depth) in the outer bay and more likely higher concentrations in the inner bay will be experienced. The biological communities present will be conditioned to such episodic events and thus will not be expected to cause any significant effects, particularly on the benthic soft bottom biota that exist.

Despite this finding, it is also observed that if effects were to occur these would be temporary, either elevated over a two - three day storm period, or at a lower SSC above normally expected background during the construction period. Benthic populations would be likely to recover on a time scale of months to a few years. To provide a comparison, the case of a large dredging programme by Ports of Auckland (which involved significant sediment disturbances much more extensive than what is proposed here), the benthic community had recovered within three years to a community indistinguishable from the surrounding area.

As noted, increased suspended sediment could also cause decreases in water clarity, and therefore the availability of light for phytoplankton in the water column, and for benthic plants on the seabed including macroalgae and microphytobenthos. The most significant impacts of increased turbidity will be restricted to the immediate area around the reclamation.

The attenuation coefficient or  $K_d$  quantifies the rate at which light is attenuated down the water column as a result of absorbing and scattering components of the water column. The  $K_d$  measured in Lyall Bay ranged from 0.15 to 0.18  $m^{-1}$ . The  $K_d$  at the optical mooring site varied from 0.09 to 0.61  $m^{-1}$ .

The levels of SSC predicted from the modelling (relative to background) based on the “above background” SSC, at approximately 150m from the discharge, for both a 1 and 2 kg/s sediment discharge show SSC (excluding the background) would be <25 mg/L except for sediment discharges toward 2 kg/s from location D1. These results for calmer conditions indicate that if the sediment discharge (equivalent to medium silt) of between 1 and 2 kg/s occurs (with exception for site D1 approaching 2 kg/s), then certainly under calm conditions when the background SSC is only 1–3 mg/L, it is unlikely to have a significant effect on benthic biota and foraging seabirds beyond approximately 150m from the discharge point.

#### **7.4.4.3 Effects of Suspended Sediment on Reef Communities**

Reef communities in the vicinity of the reclamation would be subject to the same level of increased SSC as the benthic community. The reef communities within 200–300m of the discharge points contain a mixed algal assemblage of brown and red algae,



including large kelp beds. These communities in turn support a varied faunal community dominated by sponges, ascidians and bryozoans.

Similar to the discussion above, it is considered that most reef communities are resilient to short periods of high turbidity and studies have shown that certain species are tolerant to reasonably high levels before any adverse effects arise. There is some concern however that sensitive species could be adversely affected by even a small amount of suspended sediments.

As discussed above, SSC concentrations around the reefs in Lyall Bay already experience SSC of up to 16 mg/L or more during storm events (based on the outer bay mooring; 8m depth). Increased levels of up to 25 mg/L (or more if the background levels were elevated) would be confined to a mixing area within approximately 150m of the discharge during construction and with more near field mixing and dispersion of the plume occurring during storms and strong wind events. Generally over the wider area of Lyall Bay (several hundred metres from the discharge), the “above background” contribution from a dyke sediment discharge would be less than 5–10 mg/L (for a 1 kg/s sediment discharge) and less than 10–16 mg/L (2 kg/s sediment discharge) during calm conditions, but varies with the discharge location. The NW discharge site (D1) nearest the spur breakwater, produces the highest SSC and most widespread plume of the discharge locations, with the southern D3 site producing a smaller plume more localised in the Moa Point Beach area.

Although it is not expected, if any reef communities are affected by short term exposure to increased suspended sediments, recovery is expected to be relatively quick (recolonisation is expected to begin within a few weeks).

#### **7.4.4.4 Effects of Suspended Sediment on Plankton**

Most benthic biota and fish have a planktonic larval phase which is critical for dispersion and recruitment to new habitats. These larval stages, along with permanent zooplankton and crustaceans, are generally adapted to episodic high levels of suspended sediments that occur in estuaries and harbours and along New Zealand’s coastline. Studies with different zooplankton have shown that mortality was high at SSC levels over 10,000 mg/L but generally studies have not shown any significant impact at the levels experienced from activities such as dredging.

As discussed above, increased levels of up to 25 mg/L (or more if the background levels were elevated) would be confined to a mixing area within approximately 150m of the discharge during construction and substantially lower in the wider Bay (see previous sub section). SSC over Lyall Bay is predicted to be well below the level that is known to have a significant impact on zooplankton communities, fish eggs and larvae (> 100 mg/L). It is also noted that any impact, if it were to occur would be short term as zooplankton have a short life cycle, so recovery would be relatively rapid through recruitment and advection from other areas.

#### **7.4.4.5 Effects of Suspended Sediment on Birds, Fish and Marine Mammals**

Release of suspended sediments can also impact on birdlife through potential impacts on foraging capability, or through effects on food resources. With the levels of SSC predicted, the ability of visual feeding birds to detect prey is unlikely to be impacted.



The construction is also unlikely to interrupt or affect the foraging of birds that feed in the immediate or surrounding area. Any effects, if they were to occur would be temporary and impact on a very small percentage of their foraging area, or the Wellington shoreline bird community in general.

Marine mammals, such as common dolphins, Orca and occasionally Southern Right Whales have been observed in Lyall Bay and nearby surrounding areas. These species however all forage over large areas and depths greater than 20m and therefore will not be impacted by the potential SSC effects that could arise during construction.

Fish are well adapted to potential threats and typically swim away from any high levels of turbidity. Some of the invertebrates that fish feed on could be impacted in the immediate vicinity of the construction area by high levels of suspended sediments, however these effects as described above, are considered to be very localised and likely to be negligible.

The effects of suspended sediments have been studied for one of New Zealand's fish species, snapper. This study found that prolonged exposure to SSC greater than around 170 mg/L can result in adverse growth and developmental effects from physiological stress. Lethal suspended sediment thresholds have not been conducted on any New Zealand marine fish species, but lethal SSC levels for freshwater fish are at or above 1,000 mg/L.

Overall it is considered that fish eggs, larvae and adults can tolerate much higher concentrations of SSC than those predicted to occur from this Project. Waves and currents will also rapidly disperse material that settles in the surrounding area, so any impacts on fish communities and fishers in these areas are likely to be very localised and short term.

#### **7.4.5 Assessment of Effects – Sedimentation**

When sediments settle out they can smother benthic animals and plants causing reduced growth and changes to community structure and in extreme cases mortality. Exposed coastlines are subject to dynamic and high energy events and thus the communities are resilient to episodic periods of higher sedimentation.

Settlement of fine material can smother algal mats and kelp beds but they can generally survive up to 2–3 cm of sedimentation, although this also depends on how quickly it occurs. The coastal area where the runway reclamation is located is very exposed often to high waves and swells, so any material settling out would be rapidly remobilized and dispersed (along with fine material from other sources on the seabed), contributing to the higher SSC that naturally occurs during such events. Benthic communities found in Lyall Bay are very resilient to southerly wave and swell events.

Sedimentation can smother reef communities and reduce growth, grazing and recruitment.

The Lyall Bay environment is subject to regular strong winds and to storm events which will prevent significant sedimentation and disperse material that may settle temporarily.

Overall impacts on reef animals and macroalgae from sedimentation sourced from the construction site, if it does occur, are likely to be very localized, short term (up to a few weeks) and either minor within a few hundred metres of the discharge or negligible for greater distances.

Sedimentation can have direct and indirect effects on birds and fish. Sedimentation as a result of the construction of the reclamation is predicted to be very low and if it did occur would be negligible, very localised and short term.

#### **7.4.6 Assessment of Effects – Underwater Noise**

The installation of stone columns and/or vibro-coring in the seabed and reclamation area to support the rock dyke and runway fill material has the potential to generate underwater noise. This underwater noise potentially could affect some fish species that produce and are receptive to sound. There may be the potential for impacts on some aquatic animals, particularly fish and mammals. Animals with swim bladders (many fish and marine mammals) and other sensitive organs can be impacted by sudden pressure waves causing rupture and possible mortality. Some fish species are more susceptible than others, with those living on the bottom often not having swim bladders and thus being less susceptible.

Certain fish species, such as red gurnard and bigeye, produce and are receptive to sound. These species may be more susceptible to adverse effects of underwater noise. Red gurnard produce vocalisations exceeding 60 dB over a frequency range of 100 - 500 Hz, while peak sound output by bigeye is over the frequency range of 100 – 400 Hz. The sensitivity of red gurnard to sound has not been described but it is assumed that they are sensitive to the same frequency range as they produce. Studies describe the hearing mechanism in bigeye and determined the detected sound up to 1000 Hz but were most sensitive at lower frequencies (100 – 400 Hz). Hapuka hearing ability increased with age to reach a bandwidth of 100 – 1000 Hz, and with greatest sensitivity to 100 - 600 Hz one year after hatching. Juvenile snapper had bandwidths of auditory sensitivity ranging from 100 to 2000 Hz but were most sensitive to lower frequencies.

The range of 100 – 400 Hz is typical for fish and overlaps with the frequency range likely to be produced by construction activities. As the attenuation of sound underwater is slow, it is reasonable to expect some masking of fish calls in the vicinity of the construction area. However, given that the principal sound producing fish in the area (red gurnard) is uncommon in Lyall Bay, mobile and is widely distributed through the region, the effects of underwater noise produced during construction on the gurnard population along Wellington's south coast is likely to be negligible.

Birds and mammals existing in the area are already used to a noisy environment (e.g. overflying aircraft), and are highly mobile meaning that they can move away from any noisy source. To again provide a comparative example, surveys on the noise impacts arising from blasting activities (not proposed with regard to the proposed runway extension) undertaken by Port Otago, determined that it had little or no effect on marine mammals, birds and shellfish. Marine bird life appeared to be completely unaffected and no marine mammals were recorded in the vicinity of the blasting activities. This

indicates that significant noise arising from construction activities does not appear to adversely affect marine mammals, birds and shellfish.

The main effects on birds during the construction would arise from noise, lights and the appearance of large machinery. These effects and potential impacts if they were to occur could be mitigated with appropriate shading of lights.

#### **7.4.7 Measures to Avoid, Remedy or Mitigate Actual or Potential Adverse Effects**

Measures to address any potential adverse effects on ecological values within the CMA and water quality are set out below. These measures will be implemented via an EMMP. This plan is described in more detail in Chapter 8.

##### **7.4.7.1 Suspended sediments**

There are a number of best practice guidelines available to avoid and mitigate impacts of activities such as construction of reclamations. The major mitigation measures required are for treatment of the dewatering discharge and ensuring construction operations minimise the risk of adverse effects on birds and mammals. Best practices with sediment laden water discharges include the deployment of booms (within the confines of the construction site) to prevent spread of particulate material and if the TSS concentrations in the discharge is likely, or demonstrated to be high, then settling ponds or geotextile screens can be used within the construction site to ensure the discharge meets SSC or turbidity standards (after allowing for reasonable mixing). The measures that will be employed will be described in the CMP and ESCP (refer to Chapter 8).

##### **7.4.7.2 Rock wall construction**

The construction of the rock wall could be completed in such a way that provides additional or enhanced habitat for the biological community within the area. NIWA has investigated the current state of the literature on rock wall construction to enhance biodiversity and potential options for the construction. Full details are provided in Appendix One of **Technical Report 19**. This investigation has led to the following recommendations to be incorporated into the final design for the rock wall:

- The addition of roughened/pitted surfaces on 50% of each accropode would increase the range of microhabitats available for colonising marine algae and invertebrates, while the inclusion of five shallow (100 mm deep, 250 mm wide, 1000 mm long) indented prisms along the arm of each accropode (the five indented prisms to be spaced equally around the circumference of each arm) would increase the possibility of at least one forming a rock pool no matter what the final orientation of each accropode. The indented prisms on the underside of accropodes would provide suitable cavities for wind and sun intolerant groups such as anemones, while indented prisms on the sides of each arm would form suitable crevices for chitons and snails.
- It is recommended that one 1 m<sup>3</sup> concrete block with a truncated conical shaped hole (400 mm diameter at the top, 200 mm diameter at the bottom and 400 mm deep) is inserted in the top layer of the secondary armour every 10m around the perimeter of the rock dyke somewhere between MLS and MHS tide levels. This

will add about 85 large rock pools to the intertidal zone with large concomitant increases in biodiversity in this zone.

- To accommodate newly settled lobsters from 10-35 mm CL concrete accropodes could incorporate holes of three sizes; small (15 mm diameter by 45 mm deep), medium (25 mm diameter by 75 mm deep), and large (40 mm diameter, 120 mm deep). Each 1 m<sup>2</sup> of accropode surface would have a minimum of one hole of each size (i.e. three holes in total).

The current design of the sub-tidal parts of the rock dyke provides for a range of crevices, overhangs, flat open surfaces and dark shaded surfaces suitable for a wide range of reef fish and invertebrates, including juvenile and adult kina and paua. The 0.5m filter bed where the rock dyke meets the seabed is sufficiently stable (and of suitable material – i.e. stable hard substrate) for the attachment and growth of macroalgae in order to reduce sediment scour around the rock dyke.

Generally, blue penguins respond well to the provision of artificial nesting opportunities. However, the exposed nature of the site and proposed construction of the runway extension, and in particular the characteristics of the primary and secondary armour layers, appear to provide little opportunity for the inclusion of artificial nesting boxes for blue penguins, nor for any planting of native coastal plant species to further increase the attractiveness of artificial nest boxes. The proposed construction may provide nesting sites for penguins without the need for artificial nest boxes, especially on the more sheltered eastern side of the proposed runway extension.

#### 7.4.7.3 Other measures

Other measures to minimise the impact of the construction on ecological values and water quality within the immediate area include:

- Use of cleanfill low in silts. Marine sands would be the best infill material.
- Shading of lights during construction to minimise risk of bird attraction and strikes.
- Stopping construction activities if marine mammals are observed nearby – as per best practice guidelines.
- Field collection of mobile macro-invertebrates (e.g. paua, kina, large gastropods, starfish, etc.) from reefs destined for burial, holding these for the construction period in sea water facilities on land, and their later transfer to new reef surfaces once the construction is completed, could help to mitigate the effects of the loss of rocky reefs and their resident populations within the construction zone and speed up the repopulation of the rock dyke.

## 7.5 POTENTIAL EFFECTS ARISING FROM THE SUBMERGED WAVE FOCUSING STRUCTURE

As discussed in Section 7.3, the DHI assessment has determined that the proposed runway extension would not cause a noticeable sheltering or reduction in wave height along the three inshore surf spots within Lyall Bay (“The Corner”, Middle Beach and Western Beach). However, the design of the rock revetment is expected to reduce wave refraction to the east which could result in a reduction of surf rides within Lyall Bay. The proposed runway extension will also cause the loss of the surf sport, “Airport Rights”. As described in Chapter 4, DHI has recommended that a SWFS is installed to mitigate this loss in surfing amenity within the bay. The purpose of the structure is to focus wave energy towards a shoreward location along the middle or western section of Lyall Bay, thereby forming a local wave peak. This will be designed to generate larger waves, longer ride lengths and an increase in overall surf amenity.

This section discusses the potential effects on ecological values and coastal processes arising from the proposed submerged wave focusing structure. The information contained in this section is based on the following technical assessments:

- Technical Report 14 – DHI Preliminary Shoreline Assessment;
- Technical Report 20 – NIWA Assessment of Ecological Effects Arising From the Submerged Wave Focussing Structure.

### 7.5.1 Existing Coastal Environment

As described above, Lyall Bay is the largest embayment along Wellington’s southern coastline and is exposed to southerly swells. The sediments within the bay are dominated by well sorted fine sands.

The proposed and approximate location for the SWFS is shown in **Figures 1-5 and 1-6**.

Sediments within the bay are dominated by well sorted fine sand. Megafauna observed at sites within vicinity of the proposed structure was sparse and included a single asteroid (starfish) and a pagurid (hermit crab). Benthic communities sampled in Lyall Bay were also particularly low in overall abundance and species richness compared to those typically encountered in sandy substrates in sheltered harbours of similar depths. This is likely due to the regularity and magnitude of wave events that sweep the seafloor, removing organisms that are not buried or strongly attached. With the exception of ghost shrimp, *B. filholi*, none of the species found were considered to be rare or unique. Ghost shrimp, which, while not unique to Lyall Bay, occur at potentially higher densities than were recorded, judging by the number of burrows that were observed in video imagery of the area. Ghost shrimps are deposit feeders, generally residing within their burrows. They may also provide a food source for some fish species and mobile predators.

## 7.5.2 Assessment of Effects of the Submerged Wave Focusing Structure on Ecological Values

The potential adverse effects arising from the SWFS on ecological values have been identified as:

- Smothering of benthic communities.
- Sediment changes.
- Introduction of hard substrates.
- Construction effects – turbidity, sedimentation.

Each of these potential impacts are discussed below.

### 7.5.2.1 Smothering of Benthic Communities

An artificial structure such as the proposed wave focussing structure, when placed on soft or sandy sediments such as the seabed in Lyall Bay, will necessarily result in the smothering of sediments and associated in- and epi-fauna and flora (animals and plants living within and on the sediments) which in most cases will lead to mortality. The proposed footprint of the preliminary design of the wave focussing reef was given as 20,000 m<sup>2</sup> which is just greater than 1% of the 189 ha of total soft sediment habitat within Lyall Bay. It is estimated that the area of soft sediment habitat within the 5 to 10m depth range within Lyall Bay, the depths within which the proposed wave focussing structure would be placed, is approximately 38 ha, in which case the wave focussing structure would smother approximately 5 % of this habitat.

### 7.5.2.2 Sediment Changes

The introduction of a wave focussing structure may also alter local hydrodynamics resulting in some localised sand scour and sediment accumulation. Investigations relating to artificial reefs described sediment scour to a depth of 20 – 40 cm as far as 15m from the reef edge, together with changes in sand ripple patterns and an increase in sediment grain size associated with introduced structures in 13m water depth. For reefs in depths of 25m however, scouring only extended 1 – 2m from the reef edge, with no grain size changes. Conversely, other studies noted some scouring around artificial reef modules in 9 to 13m water depth, as well as sediment accumulation of up to 0.75m in height, but no changes were observed in sediment characteristics.

In light of these results, NIWA considers it possible that the shallow depth of the proposed structure, together with the dynamic nature of the Lyall Bay environment, may result in some scouring, sediment accumulation and/or changes in sediment grain size in the vicinity of the structure. Sediment grain size can be a key driver in benthic community structure and as a result the benthic community in sediments surrounding the structure could be altered.

### 7.5.2.3 Introduction of Hard Substrates

The introduction of an artificial structure in Lyall Bay could also provide hard substrate for the colonisation of fouling species and also potentially shelter and refuge for mobile taxa potentially increasing the biomass per unit area of seabed. However, because the structure is within a high energy area, and in shallow depths, sand scour from storms



and wave surge may inhibit the development of biotic communities on the structure. However, colonisation could be expected in sheltered crevices, on lee surfaces and perhaps on the more elevated parts of the structure.

### **7.5.3 Assessment of Effects of the Submerged Wave Focusing Structure on Shoreline Morphology**

DHI has also undertaken an assessment of the shoreline impact that could potentially arise as result of the location and design of the structure within Lyall Bay.

By design the SWFS works by focussing the waves behind the structure, thereby increasing the peakiness of the wave field, which in turn is intended to enhance surfing amenity. The focusing of waves by the structure increases the amount of wave energy behind the structure while reducing wave energy at both sides. The increase/decrease in wave energy will lead to a corresponding response in the sediment transport, potentially causing shoreline retreat behind the structure and corresponding accretion to either side.

A modelling analysis of the potential shoreline impact arising from the proposed runway extension, and addition of the submerged wave focussing structure has been undertaken using the MIKE21 FM Shoreline Model. The model predicts a local reorientation of the shoreline position such that the mean position of the shoreline recedes approximately 10-15m in the lee of the submerged focusing structure along a 200 m wide stretch of the beach and accretes along a 300m wide stretch approximately 5m on both sides. It should be noted that these changes correspond to approximately two thirds of the natural yearly shoreline fluctuations, which are around 20m along this section of Lyall Bay. The predicted changes to the shoreline would occur on top of the natural variability, and are not considered to be significant.

The SWFS slightly redistributes the mean position of the shoreline, such that the shoreline retreat in the lee of the structure is compensated equally by accretion along adjacent sections of the beach.

The reorientation of the shoreline is dependent on the location of the SWFS and could be utilised to provide a slight benefit for the management of the shoreline by causing accretion in a vulnerable location at the expense of recession in a location that is less vulnerable. Such an optimisation is possible and consideration of it is recommended as part of the concept design.

### **7.5.4 Overall Conclusions and Recommendations for Mitigation**

With regard to potential ecological effects, the assessment undertaken by NIWA concludes that the largest ecological impact arising from the placement of the structure within Lyall Bay is likely to be the direct smothering of the benthic community below the structure, which is likely to be dominated by the deposit feeding ghost shrimp. However, the sparse existing benthic community, together with the highly dynamic environment that the current fauna and flora inhabit, will result in overall minimal ecological impacts from the placement of the proposed structure.

Impacts during construction of the SWFS have not been specifically considered, however it is noted that DHI has recommended the use of a floating barge with precision deployment, which would allow for more precise and careful placement of the rock. Should this method be used, NIWA is of the view that minimal additional impacts would be anticipated, with the exception of a possible sediment plume. However any sediment released during construction would be temporary and rapidly dispersed.

The reorientation of the shoreline is dependent on the location of the SWFS and could be utilised to provide a slight benefit for the management of the shoreline by causing accretion in a vulnerable location at the expense of recession in a location that is less vulnerable. Such an optimisation is possible and consideration of this is recommended as part of the concept design. This will be detailed and implemented as part of the SMAMP as described in Chapter 8.

## 7.6 EFFECTS ON TANGATA WHENUA AND CULTURAL VALUES

This section provides an overview of WIAL's engagement with iwi in identifying and assessing the impacts of the proposed runway extension on cultural values that are present in and around the Lyall Bay area. This assessment draws on the Cultural Values Report that has been prepared by Raukura Consultants, and on the CIA that prepared by Raukura Consultants (refer **Technical Reports 4 and 13**) and a draft CIA prepared by Te Rūnanga o Toa Rangatira Inc (Te Rūnanga).

### 7.6.1 Tangata Whenua of Wellington

There are three iwi groups who are identified as exercising kaitiakitanga within the WCC geographical area, and have a direct interest in the applications. It is understood that they are:

- Taranaki Whānui ki te Upoko o te Ika.
- Te Atiawa (Wellington).
- Ngāti Toa Rangatira.

The Wellington Tenth Trust and Palmerston North Maori Reserve Trust<sup>39</sup> and Port Nicholson Block Settlement Trust are the relevant iwi authorities for Te Atiawa (Wellington) and Taranaki Whānui. Ngāti Toa Rangatira cultural associations with the area have been formally recognised more recently in their own separate Deed of Settlement.

### 7.6.2 Existing Cultural Environment

Raukura Consultants identify that Maori have been long associated with the Airport, Lyall Bay area, from the very first arrival in Aotearoa of the Polynesian explorer, Kupe. Kupe is said to have visited around 850 AD. Kupe left a heritage of names which are still in use today in the area. For example, Kupe named many places around the Miramar Peninsula:

- Te Tangihanga a Kupe (Barrett's Reef)
- Te Aroaro o Kupe (Steeple Rock)
- Te Ure o Kupe
- Te Turangānui o Kupe (Worser Bay)

Wellington Airport in Kupe's time was beneath the sea or was part of the island called Motu Kairangi. There was a channel through what is now part of the suburb of Kilbirnie. The channel was known as Te Awa a Taia. It is thought the island of Motu Kairangi connected to the mainland in an event called Haowhenua around 1460. This was a tectonic uplift event, and this is what created the isthmus that is now Kilbrinie and Rongotai.

<sup>39</sup> Palmerston North Maori Reserve Trust and Wellington Tenth Trust are known as "sister trusts". This is because they emanate from the same parents, that being the land and waters at Te Whanganui a ara. Both Trusts are comprised of etehi o nga hapu/iwi o Taranaki who are mana whenua at Te Whanganui a Tara.

### 7.6.2.1 Maori Sites of Significance

Places near the proposed runway extension such as Te Tangihanga a Kupe carry an ancient history and are linked to the stories that brought Maori to Aotearoa. An old Pa (Maori village/settlement) Rangitatau overlooks the site today from the headland just to the east. Hue te Taka the small peninsular becomes an island at high tide and provides a large area of reef as it projects into the Cook Strait. It provides shelter for the embayment which once received Wellington's sewage. This provides a launching point for spear fishermen who hunt butterfish and other species from the shore. Tarakena Bay has been associated with Rangitatau and Poito Pa and would have been a Tauranga waka as it is today with a well-used boat ramp for recreational fishers and safety craft for the Airport.

Lyall Bay itself was known as Hue te Para. Under the current runway was the rocky outcrop named Moa Point. That name was subsequently used for other places around the area including the southern end of Hue te Taka. Moa bones were certainly found in this area and probably date back to when Motu Kairangi was an island.

The name Moa Point was later associated with the place of Wellington's untreated sewage discharge to Cook Strait, however this is now known as Lavender Bay. One of the strong drivers for the treatment of Wellington's sewage and the longer outfall were the important Maori sites in the area including Rangitatau Pa, Hue te Taka Peninsular, Tarakena Bay, Poito Pa and the whole embayment of Lyall Bay.

### 7.6.2.2 Maori Settlement

Although Te Atiawa Maori were resident on the Miramar Peninsula at the time of the arrival of the New Zealand Company Surveyors it was not considered as one of the main areas of occupation, as there were no major Te Atiawa Pa or kainga. This is probably one reason no parts of the Wellington Tenth's Reserve were located on the Miramar Peninsula. Another reason could have been the very early involvement of the settlers, James Coutts Crawford, James Watt and William Molesworth. The New Zealand Company Surveyors under Captain William Mein Smith divided the peninsula into 18 lots and these were bought by a small group of early settlers. A few Maori families remained living in the bays until around 1876.

From the earliest times of Maori settlement, this was an area which had a great food source including kaimoana and at one time the Moa. The ocean of Te Moana o Raukawa (Cook Strait) provided challenges for fishers in Waka, however this was balanced with the easy access to shellfish and seaweed from the shore.

### 7.6.2.3 Fishing and Fisheries in the Area

This general part of the Wellington southern coast has strong traditional associations with both shell fishing and fin fishing for Maori, and these associations remain today. The areas of coastline from Point Dorset/Oruaiti around to Te Rae Kaihau were prime areas for paua, kina, and koura/rock lobster as well as with fin fish, blue cod, red moki, blue moki, butterfish, and tarahiki and in deeper water hapuka/groper.

To the east of the proposed runway extension, is the Taputeranga Marine Reserve, which has its eastern boundary near Te Rae Kaihau on the western side of Lyall Bay.

Divers including spear fishermen and scuba divers utilise the bay on a regular basis. Commercial operations and charter boats do not frequent the subject area, as they prefer the grounds around the outer reefs and out to the Nicholson Trench. Cook Strait does however have significant fisheries including hoki and rock lobsters. In the deeper waters of the Nicholson Trench a new King Crab fishery is being developed.

#### **7.6.2.4 Marine Flora**

The marine algae within the area are a vital part of the food chain with the macrocystis, the ulva lactuca/sea lettuce/karengo and many other being both habitat and food for species such as butterflyfish, paua and kina. In the past Maori also ate and used the various seaweed sourced from the area, from karengo to the rimurapa (bull kelp) which were used for preserving bags for various catches such as titi/mutton birds.

#### **7.6.2.5 Other Mammals and Birds**

The area is not significant for other mammals or birds that are of particular value to Iwi. It is also noted that WIAL currently undertakes black backed gull monitoring around the greater Wellington region as part of its CAA requirement to minimise potential bird strike. It is understood that the Wellington Tenth Trust has no opposition to this activity on an ongoing basis.

### **7.6.3 Ngati Toa History in the Area**

Ngati Toa is descended from Hoturoa of the Tainui waka. In 1819 Te Rauparaha participated in an expedition to Taranaki to avenge an insult. Having achieved this goal, the party comprised of Ngati Toa and allies progressed south to Te Moana o Raukawa (Cook Strait) and Te Whanganui a Tara (Wellington Harbour) continuing to fight and defeat all whom they encountered. This expedition is known as Amiowhenua.

While travelling, Te Rauparaha observed a trading ship passing through Te Moana o Raukawa as he stood at a well-known lookout point in Omere near Cape Terawhiti. The strategic advantages of Te Moana o Raukawa as a major travel and trade route were well noted by those who observed the ship and the layout of the land. When Te Rauparaha returned to Kawhia to find that the ongoing conflicts had intensified he commenced a historic campaign to lead Ngati Toa from Kawhia to settle the land around Te Moana o Ruakawa.

Te Heke Tahutahuahi (the fire lighting expedition) was the first stage of Te Rauparaha's resettlement which arrived in North Taranaki. Here Ngati Toa was joined by Ngati Tama, and members from Ngati Mutunga and Ngati Awa. Te Heke Tataramoa (the bramble bush) was the second heke which moved south from Whanganui to Ngati Apa towards the Cook Strait.

The key event marking the definitive establishment of Ngāti Toa Rangatira in the Cook Strait area was the battle of Whakapaetai or Waiorua on Kāpiti Island in 1824. Ngāti Toa defeated a combined alliance of Kurahaupo tribes and quelled any resistance from other resident iwi to their occupation of the coastal area from Kāpiti to Te Whanganui-a-Tara. In 1827 the battle of Tapu-Te-Ranga cemented Ngāti Toa's mana in Wellington through the defeat of Ngāti Ira by an alliance of Ngati Toa and their Ngati Mutunga relatives from Taranaki. Tamairangi, the Paramount Chieftains of Ngāti Ira, was taken

captive and placed under the protection of Ngāti Toa chief Te Rangihaeata. At the same time, the famed mere pounamu, known as Tawhito Whenua, was surrendered to Ngāti Toa.

From the early 1830s, an influx of Taranaki iwi to Te Whanganui-a-Tara ensued in successive waves of migration. Some of these groups were encouraged to settle in the Wairarapa with the support of Te Rauparaha. These migratory heke are often referred to as Nihoputa, Ngāmotu, Tama Te Uaua, and Te Heke Paukena. Te Rauparaha and Te Rangihaeata also allocated land to Ngāti Tama along the south west coast, principally at Ohariu in recognition of their role in achieving and maintaining the raupatu (conquest). Te Rauparaha and Te Rangihaeata then continued south across the Cook Strait leading a number of campaigns in the upper South Island. Ngāti Toa and allied iwi acquired customary rights by conquest in a large area of Te Tau Ihu (northern South Island) particularly in the Wairau Valley, Port Underwood, and Pelorus Sound.

#### **7.6.3.1 Ngāti Toa Rangatira Settlement Act 2014**

The Ngāti Toa Rangatira Claims Settlement Act 2014 came into effect in April 2014. The Crown and Te Runanga o Toa Rangatira signed a Deed of Settlement on 7 December 2012. In the settlement Ngāti Toa have a statutory acknowledgement with respect to Cook Strait.

#### **7.6.4 Assessment of Effects on Cultural Values**

In order to assess the significance of any cultural effects arising from the Project, WIAL engaged with the relevant Iwi representatives, and as set out above commissioned the preparation of a Cultural Values Report and two CIA reports (one which is currently in draft form). These reports have assisted in understanding the existing cultural values present within the immediate and wider area, and assist in determining the potential or actual effects that might arise as a result of the proposed runway extension on these values.

The potential effects have been identified as:

- Damage or destruction of sites of cultural significance.
- Impacts on customary and commercial fishing.
- Commercial and economic effects.

In order to assess the significance of any cultural effects arising from the Project, the issues of potential concern have been assessed by Te Runanga in relation to the following cultural benchmarks:

- Kaitiakitanga.
- Traditional relationships.
- Customary and commercial practices.



#### 7.6.4.1 Kaitiakitanga

Kaitiakitanga is based on the understanding that everything has a ‘mauri’ or intrinsic life force and is interconnected by whakapapa or genealogy. The primary objective of kaitiakitanga is to protect and enhance mauri in order to sustainably manage the environment for the benefit of future generations. Kaitiakitanga requires a holistic and integrated approach to environmental management.

As set out above, Ngati Toa’s kaitiaki role in relation to Te Moana o Rauakawa, which includes Lyall Bay, is recognised by the Crown in Ngati Toa’s Treaty Settlement legislation.

In assessing the impact of the Project on kaitiakitanga, Te Runanga focusses on two key indicators of environment health, ‘mauri’ and ‘Te Wai’.

Maori consider water as taonga. Maori ancestors referred to freshwater as the lubricant of life, and they maintained a strong reliance on awa (rivers) and moana (the ocean) for their physical and spiritual sustenance. The significance of the connection between tangata whenua and the coastal environment is specifically recognised by the NZCPS, particularly the value placed on maintaining mauri. Interfering or disrupting natural processes within the marine environment has the potential to adversely affect the physical and spiritual health of waterways, coastal systems and the people it supports.

In this regard, there is concern that during construction of the proposed runway extension water quality could be compromised. The nature of these effects are described in the **Technical Reports 4 and 13** and discussed in Section 7.4. In order to manage these potential effects, it is recommended that best practice erosion and sediment controls measures will need to be built into the construction methodology in order to manage this potential impact. Coastal monitoring of SSC during construction is also recommended, and it is considered that iwi is a key stakeholder in the development of any ecological mitigation and monitoring plans for the Project.

The reclamation will result in the loss of habitat and marine ecosystem within a 10.82 ha footprint. This will inevitably lead to the loss of ‘mauri’ within the reclaimed area. It is acknowledged in the CIAs however that this loss will be in part mitigated by the net gain in coastline bordered by subtidal reef that will occur as a result of the proposed rock dyke. As described in Section 7.4, further mitigation is also proposed with respect to the ecological enhancement measures that will be incorporated into the final design and construction of the rock dyke to encourage recolonisation.

#### 7.6.4.2 Sites of Cultural Significance and Traditional Relationships

It is acknowledged by Iwi that the surrounding area has been heavily modified with the construction of the existing runway and other infrastructure and amenities. The CIAs confirm that there are no known sites of Maori significance that will be directly affected by the proposed reclamation or associated earthworks on the landward side of the Airport. It is however noted that the area has in the past seen finds of taonga (carved stone and bone items) along with Moa bones. It is considered that such finds would be rare today, however it is appropriate that an accidental discovery protocol is in place throughout the construction of the proposed runway extension.

Te Moana o Raukawa (Cook Strait) is regarded by Ngati Toa as a taonga of paramount significance. The coastal settlements, resources and conditions of this water have historically shaped and influenced traditional ways of life, including the culture and identity of Ngati Toa decedents. It is important that any adverse effects on Ngati Toa's cultural values in respect of the impact of the proposal on the waters of Cook Strait are avoided, or mitigated. In this regard, the key potential effect would relate to the impacts on coastal water quality that could arise during the construction of the proposed runway extension.

#### **7.6.4.3 Customary and Commercial Fishing**

The main species targeted by customary iwi fishers along the Wellington south coast, including Lyall Bay, are paua, koura and kina. Iwi also have interests in commercial fishing operations in the Cook Strait. The loss of habitat and potential effects arising during construction with respect to water quality could potentially affect customary and commercial fishing operations undertaken by Maori.

#### **7.6.4.4 Other Impacts**

Other potential impacts have been identified in the CIAs as potential effects on iwi recreational users, and the social and economic benefits that could arise from the proposed runway extension and ability for larger aircraft to fly direct to Wellington.

Maori use Lyall Bay for a variety of recreational pursuits and these could be disrupted by the proposed construction activities in particular.

Iwi, like others in the community also have significant commercial interests in and around Wellington, and there is a desire to have high quality transport infrastructure in the region. Access to overseas markets is also important to iwi for trade and commerce reasons (e.g. exportation of rock lobsters).

### **7.6.5 Measures to Avoid, Remedy or Mitigate Actual or Potential Adverse Effects**

It is evident that the significant cultural values within the area relate to sustaining the mauri of the CMA, which in turn supports other values of importance to Iwi such as customary and commercial fishing operations. In this regard the mitigation which has been described in Section 7.4 (ecological) is also instrumental in managing any potential effects on cultural values. More specifically this relates to sediment control to minimise any adverse effects on water quality during construction, and ecological enhancements that are proposed to be incorporated into the design of the rock dyke.

In response to these concerns, Iwi are supportive of the recommendation to develop an EMMP and Ngati Toa have expressed an interest to be involved in its development and implementation. This is acknowledged by WIAL and in drafting the proposed conditions, there is a requirement to consult with relevant Iwi in preparing and implementing this plan.

In addition, it is recommended that a Memorandum of Understanding (MoU) is developed between Iwi and WIAL which clearly recognises the kaitiaki role in relation to the Project area, and provides the basis for Iwi to work in partnership with WIAL.

through the course of the Project. This is agreeable to WIAL and will be developed between each of the relevant Iwi of record, subject to their respective agreement.

It is also considered necessary to adhere to an appropriate accidental discovery protocol throughout the construction phase of the Project.

## 7.7 CONSTRUCTION AND HAULAGE ROUTE NOISE

This section discusses the potential construction noise and vibration effects arising from construction of the proposed runway extension, including noise arising from construction traffic and assesses whether the extent of those effects and any necessary mitigation that might be required. The information contained in this section is based on AECOM report titled “Wellington Airport Runway Extension” and attached as **Technical Report 10**. Operational noise effects associated with the future use of the runway by aircraft are described separately in Section 7.17.

### 7.7.1 Best Practicable Option

There is a general duty contained in Section 16 of the RMA which states that:

*‘Every occupier of land (including any premises in any coastal marine area), and every person carrying out an activity in, on, or under a water body or the coastal marine area, shall adopt the best practicable option to ensure that the emission of noise from that land or water does not exceed a reasonable level.’*

As described in the following sections, measures will be taken to minimise, as far as practicable, noise emission from the construction of the Project. The New Zealand Standard 6803: 1999 “Acoustics – Construction Noise” has been applied in the assessment of construction noise and is based on the best practicable option approach.

### 7.7.2 New Zealand Standards, Regional and District Plans

There are three New Zealand standards relating to noise that are of relevance to this proposal. Specifically:

- New Zealand Standards NZS6801:2008 Acoustics – Measurement of Environmental Noise (NZS6801).
- New Zealand Standard NZS 6802:2008 Acoustics – Environmental Noise (NZS6802).
- New Zealand Standard NZS 6803:1999 Acoustics – Construction Noise (NZS6803)

NZS6801 describes the procedures for the measurement of environmental noise to ensure consistent measurement of environmental sound for all conditions within the scope of the standard.

NZS6802 sets out the procedure for the assessment of environmental noise for compliance with noise limits and provides guidance for the setting of noise limits for consent conditions, rules or national environmental standards.

NZS 6803 provides the accepted construction management framework. The standard also provides recommended noise limits for construction activities which are managed separately to NZ6802. NZS6803 includes a table of recommended construction noise limits which depend on the time of day and the duration of construction noise. The noise limits for construction projects longer than 20 weeks is set out in **Table 7-5** below.

The noise levels shown in **Table 7-5** will comprise the guideline noise limits for construction activities associated with the project.

**Table 7-5: NZS6803 Recommended Noise Limits for Construction Projects Longer than 20 Weeks.**

Time of week	Time period	dB LAeq	dB L <sub>A</sub> max
<b>Weekdays</b>	0630-0730	55	75
	0730-1800	70	85
	1800-2000	65	80
	2000-0630	45	75
<b>Saturdays</b>	0630-0730	45	75
	0730-1800	70	85
	1800-2000	45	75
	2000-0630	45	75
<b>Sundays and public holidays</b>	0630-0730	45	75
	0730-1800	55	85
	1800-2000	45	75
	2000-0630	45	75
<b>All Days</b>	0730-1800	70	-
	1800-0730	75	-

In addition to the recommended noise limits, NZS 6803 provides a framework for managing construction noise. Section 8 of the standard sets out a range on noise management measures, including:

- Noise management planning: via good project management to minimise noise problems arising;
- Noise reduction at source: including choice of machinery, noise enclosures and screens;
- Community relations: consultation and co-operation between the contractor and neighbours; and
- Site factors: including the existing noise environment, distance between the activity and neighbours, sensitivity of the neighbours (residential / commercial), and duration and hours of working.

It is noted that the GWRC Regional Plans and WCC District Plan also contain standards for noise limits which differ to the construction standards set out above. The standards in these plans have however also been considered in preparing this assessment and consent is being sought for any breach.

### 7.7.3 Existing Environment - Noise

#### 7.7.3.1 Airport Surrounds

As described in Chapter 2, the Airport operates a single runway with two directions, being Runways 16 and 34.

Residential activity closest to the Runway 34 threshold occurs along Moa Point Road, to the east of the proposed runway extension, then beyond Moa Point Road, with the elevated streets of Monorgan Way, Raukawa Street, Bunker Way, Kekerenga Street and Ahuriri Street forming the next closest residential activity to the east of the runway.

To the west of the airport across Lyall Bay there are dwellings located along Queens Drive, approximately 1.25 km distance to the existing runway 34 threshold. Further to the north along Lyall Parade there is a mixture of residential dwellings and commercial facilities at approximately 1 km from the existing runway 34 threshold.

Immediately west of the northern and central sections of the airport there are retail / commercial units on Tirangi Road. Kingsford Smith Street is occupied with residential dwellings. The remaining houses on the eastern side of Bridge Street (Numbers 17, 23, 47 and 63) are approximately 100- 110 m to the runway centre line. On the western side of Bridge Street the dwellings are approximately 160 m from the runway centre. There are a number of earth bunds within the airport boundary which partially screen the main runway from these dwellings. However the elevated dwellings on Tirangi Road, overlook the main runway at a distance of approximately 200 m from the runway centreline.

The majority of homes are single storey in height and are weatherboard clad timber buildings with single glazed windows.

#### 7.7.3.2 Sensitive Noise Receivers

Sensitive noise receivers are locations and/or buildings situated close to the proposed construction works which may be particularly affected by construction noise and/or vibration. The sensitive receivers identified for this Project are listed in Table 2 of **Technical Report 10**.

In general, the receivers closest to the construction activities will be most affected, therefore assessing construction noise and vibration levels at those receivers provides an indication of the maximum potential effect that might occur.

#### 7.7.3.3 Existing Ambient Noise Levels

A survey of the existing ambient noise levels was carried out at nine locations surrounding the Airport, as shown in **Figure 7-1**. Both daytime and night time measurements were taken over a 15 to 30-minute period. Detailed survey results can be found in **Technical Report 10** and are summarised in **Table 7-6** below.



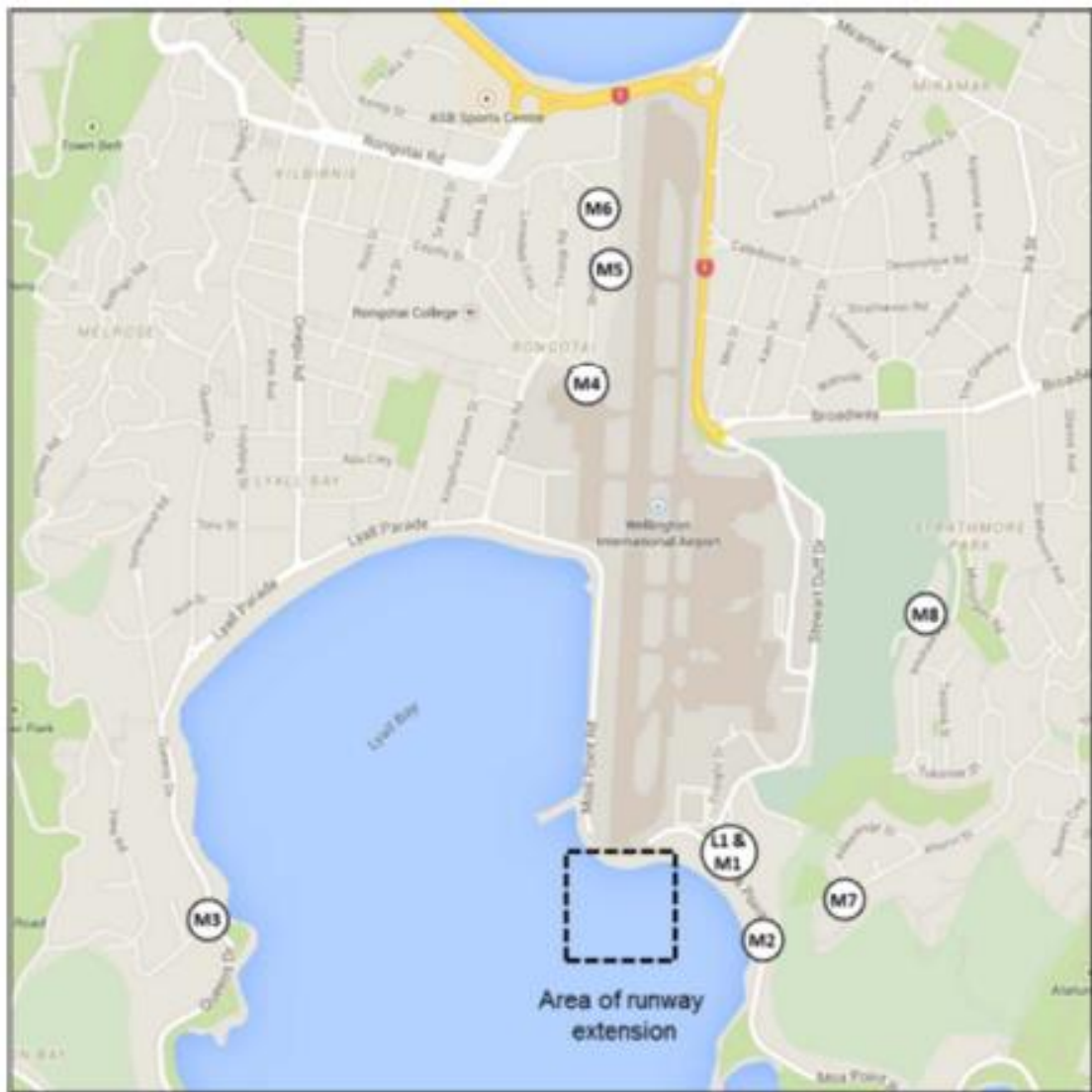


Figure 7-1: Site location plan showing measured receivers.

Table 7-6: Summary of daytime and night-time measurements. Daytime measures taken on 9 March 2015. Night time measurements taken on 25 March 2015.

Site	Location	L <sub>Aeq</sub> (dB)	Noise source
M1	Moa Point Road	Day: 64	Day: Cars, aircraft surf, sea gulls, cicada
		Night: 38	Night: Construction noise in distance just audible
M2	Moa Point Road	Day: 63	Day: Surf, cards, dog barking aircraft
		Night: 49	Night: Waves, construction noise in distance, continuous drone and cyclic rattle.
M3	Queens Drive reserve	Day: 56	Day: Cars, trucks, aircraft and some FH quarry working

		Night: 43	Night: Construction noise in distance just audible, waves.
M4	Coutts Street	Day: 64	Day: Aircraft, HEMS, ground running aircraft, demolition works on retail park
		Night: 38	Night: Construction noise in distance just audible
M5	Gaudin Street	Day: 66	Day: Aircraft, ground ops, cars
		Night: 43	Night: Construction noise in distance dominant.
M6	Bridge Street	Day: 63	Day: Aircraft, road traffic, ground ops
		Night: 44	Night: Construction noise in distance dominant.
M7	Ahuriri Street	Day: 55	Day: Cars, buses, ground ops from airport clearly audible, aircraft
		Night: 48	Night: Construction noise in distance dominant.
M8	Bunker Way	Day: 53	Day: Aircraft ground ops, cars
		Night: 38	Night: Construction noise in distance

In addition to the short term survey described above, a six-day survey was also undertaken at 36a Moa Point Road, as well as a review of the Airport's noise monitoring terminal at 73 Ahuriri Street. Both of the long term survey results displayed distinct diurnal variations between 1:00am and 6:00am.

#### 7.7.4 Assessment of Effects - Construction Noise

The predicted construction noise level for each stage of the construction programme has been calculated for the sensitive receivers shown in **Figure 7-1**. The calculated noise levels have been compared with the guideline construction limits of NZ6803 (for works greater than 20 weeks) and the level of exceedance, if any, reported. In summary, the main observations from these investigations have demonstrated that:

- All weekdays works between 6:30am-8:00pm comply with the construction noise standard limits of 55 dB between 6:30am – 7:30am, 70 dB between 7:30am-6:00pm and 65 dB between 6:00pm-8:00pm (albeit there are minor exceedances predicted in the early morning period of 6:30am-7:30am at the receivers at Moa Point – up to 4 dB).
- All works comply with the construction standard limit of 70 dB between 7:30am and 6:00pm on Saturdays.
- There are exceedances within the night time period of 8:00pm- 6:30am for Stages A, B, H, I, J and K, up to a maximum of 14 dB. The closest receptors at Moa Point have been identified as the most affected dwellings.

- There are minor exceedances of the Sunday construction standard limit of 55 dB between 7:30am and 6:00pm at the receivers at Moa Point.

While a number of exceedances have been calculated for the proposed runway extension works, the calculations do not take into account any potential noise mitigation measures that may be implemented during construction of the Project. The exceedances identified above are therefore anticipated to reduce following identification and implementation on construction noise management measures.

The predicted construction noise levels have been compared with the measured ambient noise data and the net increase in noise evaluated. The result of the two closest receivers, being Moa Point (M1) and Kekerenga Street (M5) (shown in **Figure 7-1**) are shown in **Table 7-7** below.

**Table 7-7: Difference between existing ambient noise levels and predicted construction noise levels for each stage of construction.**

Receptor	Period	Noise increase (dB) by work stage									
		0	A	B	C/D	E	F/G	H	I	J	K
<b>M1 Moa Point</b>	6:30am – 7:30am	3	1	-	-	-	-	2		2	3
	7:30am – 6:00pm	1	1	-	-	-	-	1		1	2
	6:00pm – 8:00pm	3	1	-	-	-	-	2		2	3
	8:00pm – 7:30am	N/A	4	2	1	1	1	5	2	5	8
	1:00am – 6:00am	N/A	13	9	4	5	4	15	9	15	18
<b>M5 Kekerenga Street</b>	6:30am – 7:30am	1	-	-	-	-	-	-	1	1	1
	7:30am – 6:00pm	-	-	-	-	-	-	-	1		1
	6:00pm – 8:00pm	1	-	-	-	-	-	-	1	1	1
	8:00pm – 7:30am	N/A	1	-	-	-	-	2	4	2	4
	1:00am – 6:00am	N/A	8	4	1	2	1	9	12	10	12

Where the existing ambient noise level is above the predicted construction noise level by at least 10 dB, no noise change is indicated. There has also been no assessment of site establishment works during the period 8:00pm - 7:30am as these works would not take place at night.

As is evidenced in **Table 7-7**, the greatest effect from construction noise will be felt during the night (night time period of 1am – 6am) when the Airport is not operational. During this period when existing ambient noise levels are at their lowest, construction noise may be audible. NZS 6803 provides for night time noise limits to be relaxed when ambient noise levels are relatively high, however existing noise levels at night are such that noise control measures will need to be implemented to manage construction noise effects, particularly in the evening where sleep disturbance could occur. This is addressed further below.

### 7.7.5 Assessment of Effects – Noise Associated with Construction Haulage Traffic

As discussed in Chapters 5 and 6, during public consultation residents living along local roads Bridge Street and the short section of Coutts Street between Bridge Street and Tirangi Road in particular, raised concerns with the proposed haulage route. There was concern about potential noise and amenity effects arising from the increased traffic movements in this area, particularly during the evening period (6pm – 10pm). In light of this feedback, WIAL commissioned TDG to further assess alternative haulage route options in and around the Airport site, as well as AECOM to assess the potential effects arising from traffic noise along the identified routes. Based on this analysis and further investigation into the likely traffic numbers, a revised haulage route was developed and is now proposed as part of this proposal (refer to **Figures 1-2 and 1-3** in Chapter 1).

In developing the proposed haulage route, the noise assessment (refer **Technical Report 10**) assessed the likely number of residential dwellings affected, assessed the existing road traffic noise levels and determined the likely degree of change arising from heavy vehicle movements associated with construction of the Project. This assessment found that typically  $L_{Aeq,1 \text{ hour}}$  existing noise levels at 10m along the haulage route are in the range 56-67 dB at the façade of the house. It was assessed that approximately 340 dwellings are exposed to these noise levels. Dwellings located greater than 30 m from the carriageway are likely to be shielded by other buildings which have not been taken in to consideration in the GIS screening exercise. Approximately 530 dwellings may be exposed along the haul route and at this distance noise levels will be above 45 dB  $L_{Aeq(1hr)}$  at the building's façade.

According to World Health Organisation (WHO) recommendations and NZS6802, with windows open, there is the potential for sleep disturbance effects from existing road traffic flows at night. With windows closed (standard timber weatherboard house), potential sleep disturbance effects are likely if noise levels are greater than 60 dB (based on a façade reduction of 30 dB). Again existing noise levels are likely to exceed this level within approximately 30 m of the proposed haulage route specifically during the period 10:00pm to midnight and 4:00am to 6:00am, i.e. the shoulder hours of the night time period.

With the Project's proposed construction traffic, predicted road traffic noise levels at night will also be above the relevant noise levels with windows open and with windows closed. Since there are 'identical impacts' (exceedances of the façade noise levels with and without the construction traffic) the significance of the effect is very much dependent upon the change in noise level. That is how much an increase is likely to

occur and also whether the character of the sound is the same, being more of the same or the introduction of a completely new noise source.

For both existing and project traffic, maximum noise levels from vehicle movements will be greater than 70 dB  $L_{Amax}$  since a car travelling at 50 kmh at a distance of 10m will produce a  $L_{Amax}$  of approximately 72 dB. Service vehicles and the like can produce maximum noise levels of ~82 dB  $L_{Amax}$  at 10m. Measured maximum noise levels from quarry trucks both laden and unladen are less than the noise generated by service vehicles. However, increased noise can be produced if the road surfaces are such that there is banging and rattling of the vehicle bodies as they pass over any irregularity in the roads, e.g. pot holes. It will therefore be important to ensure that the serviceability of the road surfaces is maintained throughout the construction programme.

Notwithstanding any audible characteristics which a noise source may have, a 3 dB change in the overall noise level is considered to be just perceptible. A 10 dB increase is considered a subjective doubling of the loudness of the sound. Anywhere between 3 dB and 5 dB would be considered a minor change and between 5 dB and 10 dB a moderate change. It was therefore considered that the number of vehicle movements, during the night time period, should not generate a noise level that exceeds more than 3 dB above existing ambient noise levels. The following table provides the maximum number of construction vehicle movements that can occur on the proposed haulage route to achieve a 3 dB or less change in existing night time noise level:

**Table 7-8: The maximum number of construction vehicle movements to achieve a 3dB or less change in existing night time noise level.**

One hour period starting	Hawke stone Interchange	Terrace Tunnel	Arthur Street	Vivian Street	Paterson Street	Ruahine Street	Cobham Drive	Calabar Road
10:00pm	30	30	30	30	30	30	30	30
11:00pm	30	30	30	30	30	25	30	30
12:00am	30	30	30	30	30	25	30	30
1:00am	30	30	30	20	30	15	25	20
2:00am	15	15	20	15	15	5	10	5
3:00am	25	20	20	30	30	10	25	20
4:00am	30	30	30	30	30	20	30	30
5:00am	30	30	30	30	30	30	30	30

Ruahine Street is considered to be the controlling road with respect to construction vehicle movements and following consultation with TDG, a diurnal pattern of construction vehicle movements has been developed. The daytime hours are constrained due to normal traffic conditions at intersections, whereas the night time period is noise limited, i.e. a 3 dB or less increase in road traffic noise. As shown in the **Table 7-9** below the most sensitive noise period is from 0100h to 0400h. In the most

noise sensitive hour there can only be a maximum of five vehicle movements (10 two-way movements).

**Table 7-9: Maximum construction vehicles per time period.**

One hour period starting	In/out via State Highway 1	Airport (clockwise) loop
9.30am	-	15
10:00am	-	30
11:00am	-	30
12:00pm	-	30
1:00pm	-	30
2:00pm-2.30pm	-	15
10:00pm	30	-
11:00pm	25	-
12:00am	25	-
1:00am	15	-
2:00am	5	-
3:00am	10	-
4:00am	20	-
5:00am	30	-

Provided that the haulage vehicle numbers detailed above are adhered to then the adverse effects on residential receptors along the haulage routes would be mitigated to an acceptable level.

In terms of the character of the sound that will be generated, it is noted that construction traffic and large vehicles, including service vehicles, road sweepers and the like, already use the haul route throughout the day and night albeit that the magnitude of the movements is not identical nor is the duration of the Project. Construction traffic can have clearly perceptible characteristics compared with other traffic if:

- The driver is accelerating hard or using engine braking (driver behaviour);
- The body of the vehicle is loose so it rattles and bangs when travelling over irregularities in the road; and
- The vehicle is reversing and has tonal warning alarms instead of being fitted with less intrusive broad band alarms.



Wellington city centre and the majority of the haul route is a State Highway or Principal Road and there can be an expectation that road traffic noise will be audible even at night. Therefore, provided that the vehicles are well maintained (as should be the road surface) and driven in a reasonable manner the likelihood of any adverse audible characteristics is diminished.

### 7.7.6 Assessment of Effects – Noise Effects on Marine Wildlife

Construction activities will generate noise within the water column during the reclamation process. The most significant activity will be when inserting stone columns in the seabed and reclamation area. Piling will also occur for temporary mooring purposes and potentially for other structures required to facilitate the construction process.

Underwater sound can cause disturbance to noise sensitive marine species including marine mammals. Typical effects include changes in behaviour such as avoidance of areas where noise is being generated. The effects of the proposed Project in this respect, including construction effects, is considered separately in Section 7-4.

### 7.7.7 Assessment of Effects Noise Effects on Recreational Users

There are a number of recreational users present in the Lyall Bay area that may be exposed to noise associated with the proposed runway extension construction activities.

Recreational users will generally only be present during daytime hours and, unlike residents, are transient users. During these times there is a relatively high level of ambient noise from non-construction related noise sources. The predicted noise levels for recreational receivers is described in **Table 7-10**.

**Table 7-10: Predicted noise levels for recreational receivers.**

Receiver	Predicted noise level, $L_{Aeq,1hr}$ dB	
	Runway extension	Haul Route
Outdoor seating at Spruce Goose café	33-48	57
Surfing activities and other users of Lyall Bay Beach	34-49	51
Plane spotters on Moa Point Road	44-59	57
Walkers on south coast	45-60	61
Golf Course	35 -48	56 -38

In certain situations, construction and haul route traffic noise will be masked by high levels of ambient noise. This is especially the case for the receivers close to the sea and runway, for example, surfers and beach-goers in Lyall Bay, and plane spotters on Moa Point Road. Should ambient noise levels reduce, construction related noise would become the most dominant source of noise, e.g. during calm weather conditions and limited aircraft activity.

Noise from the haulage route will be most noticeable to recreational users immediately adjacent to the route (which includes cyclists and pedestrians), which will predominantly be patrons of the Spruce Goose café and plane spotters sitting in their vehicles. At the café, construction vehicles will pass along the road unladen at a frequency of approximately one every two minutes (during certain windows). Trucks will not be accelerating or decelerating and therefore construction vehicle noise will be at the lower end of the expected range of levels and will be comparable to other large vehicles such as delivery vehicles servicing the local commercial areas. At the Moa Point Road carpark, the noise environment will be dominated by aircraft take-offs and landings.

Construction related noise at the Spruce Goose café will be below ambient noise levels, with the dominant noise source being aircraft activity. Patrons of cafés and restaurants in the area will be used to the elevated levels of noise associated with an operating airport, and can generally be expected to be tolerant of construction noise audible during lulls in airport activity.

Walkers on the south coast at Moa Point and cyclists may experience elevated noise levels when immediately adjacent to the haul road; however, the haulage traffic noise will quickly decrease as the walkers move away from the road and as vehicles pass. At the closest locations to the haul road, noise from individual trucks passing by will generally be below the noise level associated with an aircraft take-off or landing.

Users of the golf course will be exposed to more construction vehicle noise at varying levels depending upon their proximity to the haulage route. The noise levels generated are not considered likely to disrupt golfers when compared to the noise of aircraft movements.

#### **7.7.8 Assessment of Effects - Construction Vibration**

Vibration effects from the Project are not considered significant. There will be no piling or vibrocompaction within 100m of any residential dwelling. Potential vibration effects may arise as construction vehicles pass by sensitive receivers such as residential dwellings, however it has been assessed that such effects are only likely to occur if there are significant irregularities in the road surface.

#### **7.7.9 Measures to Avoid, Remedy or Mitigate Construction Noise and Vibration Effects**

The assessment of construction noise effects has identified that many of the construction activities will produce noise of similar level to existing airport operations during operational hours. At certain stages of construction, during the night time period of 1:00am to 6:00am when the Airport is closed to scheduled aircraft movements, construction noise will be audible and likely adverse without appropriate mitigation measures and operational controls.

The principal contractor will be required to prepare a CNVMP which will include predictions of construction noise and identifying necessary mitigation measures. Regardless of compliance with any criteria, best practices will always be adopted to minimise any unnecessary noise. A draft CNVMP is attached as Appendix F of

**Technical Report 10** and will be updated prior to construction to include any additional conditions attached to the relevant resource consents.

A mitigation package will be developed in agreement with the most affected residents (i.e. those residents along Moa Point Road). This could include temporary re-homing during night time construction activities, acoustic mitigation packages, or property purchase. A Construction Liaison Group will also be formed to discuss environmental issues raised by the construction process. The terms of engagement for the Construction Liaison Group will be set out in a separate Stakeholder and Communications Management Plan and will identify the proposed means of disseminating Project information and complaints procedures to surrounding residents, particularly those living along Moa Point Road.

Pre-construction structural assessments of identified residential dwellings along the haulage route will also be offered to residents to ensure that any unforeseen vibration effects are appropriately remedied on the completion of the works.

With the above measures in place, the potential adverse effects of the works on the amenity of the surrounding noise sensitive receivers can be appropriately managed.

## 7.8 TRAFFIC EFFECTS

This section discusses the potential construction transportation effects arising from construction of the proposed runway extension. The information contained in this section is based on TDG's Transportation Assessment Report attached as **Technical Report 9**.

It should be noted that the final method for the transportation of fill material to the construction site will not be finalised until the contract is awarded and details around the source of construction material confirmed. The following assessment therefore assumes a 'worst case' scenario, whereby all fill material will be transported to the site by road. Barging material may be a viable alternative option for transporting some construction materials direct to the construction site and as such, further mitigate the road transportation effects discussed in this section.

### 7.8.1 Existing Transportation and Traffic Environment

Wellington Airport is well connected and served by the State Highway network. **Figure 1-4** illustrates the roading hierarchy for the southern area of Wellington City. It shows SH1 variously as a defined route in its own right as well as an Arterial Road for the eastern sections following Ruahine Street, Wellington Road, Cobham Drive and Calabar Road. The route around the south coast, including Moa Point Road and Lyall Bay is classified as a Principal Road, together with Onepu Road, Evans Bay Parade, Troy Street and Rongotai Road to the west of the Airport.

In this location, the intended construction site is well positioned with respect to road options available for transporting construction materials.

Most heavy construction equipment and over dimensioned loads will be delivered to the site using SH1 and SH2 and other defined over dimensioned routes.

As conservatively assumed for the purposes of the traffic assessment, the vast majority of the materials will be transported by road to the proposed construction site from the existing quarries located at Kiwi Point (Ngauranga Gorge) and Horokiwi (south of Petone), with transportation routes centred principally on SH1 and SH2.

The road transport routes to be used by construction related traffic for the proposed runway extension are proposed to involve the following roads to and from the two nominated quarries:

- SH2 (connecting with SH1 at Ngauranga Gorge);
- SH1 from Ngauranga Gorge to Cobham Drive and Calabar Road;
- The inbound (southbound) transportation through the Airport precinct, and outbound (northbound) transportation through the Airport precinct at night time and via Principal Roads on the western side of the Airport during day time (refer to **Figures 1-2** and **1-3** in Chapter 1).

Trips by construction workers, sub-contractors, and routine deliveries will be made to and from the site compounds and the site directly, via the public roading network and Stewart Duff Drive.

TDG has completed route inspections of the various roads available for haulage vehicles arriving and departing from the proposed runway extension site.

The weekday peaks along the relevant sections of the State Highway network occurs generally between 7:00am and 9:00am, and 4:00pm and 6:00pm. These peaks correspond to workbound and homebound commuter demands, with substantially less traffic flows through the intervening period (with an exception between 9 – 9:30am and 2:30 – 3:30pm for school drop-offs and pickups), which are also less than the corresponding weekend flows. Traffic congestion occurs during these weekday commuter peaks, when travel times are also less reliable and often widely different on differing days of the week. This is one of the key reasons for proposing that truck haulage of fill material on public roads avoids these traffic peaks and instead occurs during the following transport widows:

- 9.30am to 2.30pm weekdays – inbound via the Airport precinct, and outbound via Principal Roads on the western side of the Airport; and
- 10.00pm to 6.00am weekdays – inbound and outbound via the Airport precinct.

For Calabar Road, and to a lesser extent Cobham Drive, the traffic patterns are influenced strongly by Airport traffic, but again showing weekday morning and afternoon peaks. In each instance, traffic volumes during the middle of the day remain smaller, and again less than the equivalent weekend flows.

Near the Basin Reserve, SH1 supports a large volume of commuter traffic travelling to and from the city and suburbs on the eastern side of Mt Victoria Tunnel and importantly also, the Airport. It provides access to the regional hospital and, in the immediate area, access to many local schools (including Wellington East Girl's College, St Mark's Church School and Wellington College), and also Massey University. Further south, SH1 provides access to the Wellington Aquatic Centre, St Patrick's College, Rongotai College, as well as many retail and commercial businesses throughout.

Through Lyall Bay weekday traffic volumes are relatively flat, with slight commuter peaks and increased traffic occurring on the weekend. For this reason no truck haulage on public roads is proposed on weekends.

These local and wider land use sensitivities are another reason for proposing truck haulage during off-peak day time and night time periods, and in a way that avoids the 'before' and 'after' school peaks and weekends.

### 7.8.2 Transport Routes Through Rongotai

Due to previous and ongoing physical changes at the Airport, over dimensioned vehicles cannot travel on Stewart Duff Drive through the airport precinct. Consequently, NZTA's designated OVR, which had previously followed Stewart Duff Drive now diverts from the route at the intersection of Station Drive and continues (airside) across the Airport to link with Freight Drive. The revised airside OVR is subject to strict Airport operational limitations.

While the airside OVR is practical for occasional over dimensioned loads, Airport operations prevent it from being considered a viable truck access route for construction purposes. In the same way, it is not practical to provide for trucks to access airside on the western apron. Airport Operations advise that frequent truck volumes cannot be managed in a responsible and safe manner alongside the critical airside activities, without creating significant risk for and interference with aircraft and apron movements. As a result, road access to and from the construction site needs to be achieved via a combination of SH1/SH2, the Principal Road network, and the Airport-owned Stewart Duff Drive.

On the eastern side of the Airport, Calabar Road extends southwards as Stewart Duff Drive, through the Airport precinct. This is a viable southbound haulage route (day time and night time), but the return northbound route through the Airport precinct immediately adjacent to the terminal building during the day is not, since it would compromise the safety and movement of Airport visitors in this very active and dynamic part of the Airport precinct, and noting also that the bridge structure at this Level 01 concourse was not designed or built to carry frequent heavy trucks. That said, a managed solution can be implemented along Stewart Duff Drive to provide for outbound trucks during the night time when the Airport is less busy. However during the day time, Principal Roads on the western side of the Airport are proposed for the return outbound journey to SH1.

On the western side of the Airport, the OVR follows Tirangi Road, Coutts Street, Salek Street and Troy Street between Lyall Parade and SH1. This generally follows the city's defined Collector Roads, but noting that the OVR also includes a Local Road variant via Te Whiti Street. The OVR does not follow the higher – functioning Principal Road route of Onepu Road since that road is an established bus route with trolley bus wires that prevent access by over dimensioned loads. They do not however prevent access by standard trucks. TDG has recommended that haulage trucks be accommodated by Principal Roads rather than the OVRs.

### 7.8.3 Assessment of Effects – Haulage Route

The proposed haulage route is shown on **Figures 1-2 and 1-3** in Chapter 1. As noted during the week day (9:30am to 2:30pm) the haulage route for heavy vehicles will involve inbound trips via the Airport precinct, with the outbound route made via Principal Roads on the western side of the Airport. At week night (10:00pm to 6:00am), the haulage route will involve both inbound and outbound trips via the Airport precinct.

#### 7.8.3.1 Inbound Haulage Route (Day time and Night time)

The recommended inbound haulage route on the eastern side of the Airport follows SH1 to the Broadway roundabout, Stewart Duff Drive, through the Airport precinct to connect with Freight Drive at a tee intersection near the southern end of the Airport.

Stewart Duff Drive is a private Airport road, to which through-traffic is granted access by WIAL. Freight Drive is also an Airport-owned private road, from where access will be available to the eastern site compounds and internally to the runway construction site. As private Airport roads, heavy vehicles can be safely managed by WIAL during the haulage windows through the precinct in a manner that minimises disruption for



other Airport related traffic, including, for example, by dedicating barriered entry and exit lanes to accommodate haulage trucks.

### 7.8.3.2 Outbound Haulage Route

As noted above, two routes are proposed for the use by outbound heavy vehicles. During the night time outbound traffic will use the same route as was used to access the site through the Airport precinct. Due to high numbers of Airport related traffic, a differing day time outbound route is proposed on the western side of the Airport. This route follows Moa Point Road, Lyall Parade, Onepu Road and Evans Bay Parade. This route has been selected for outbound haulage since it forms part of Wellington City's Principal Road network, which has a predominant through traffic function and where a range of vehicle types (including trucks) is anticipated.

The outbound route passes through four signalised intersections at:

- Onepu Road / Coutts Street;
- Onepu Road / Rongotai Road;
- Evans Bay Parade / Kilbirnie Crescent; and
- Evans Bay Parade / Cobham Drive.

These intersections have been assessed as the key traffic capacity limitations on the outbound day time route. Each functions with varying signal cycle times during the day, usually of the order of 80 to 100 seconds in the proposed day time transport window (9:30am to 2:30pm), and up to 120 seconds at morning and evening peak times.

It is assessed that beyond the addition of one haulage truck per northbound signal phase, the addition of more trucks per cycle would begin to become noticeable to existing users. This would materialise in the form of queue space being occupied by trucks, with a gradual deterioration in intersection performance that, while not significantly compromising levels of service at off-peak times, will result in some existing users being unable to travel through the intersection in a single green phase as they can at present.

It is for this reason that it is proposed to limit outbound truck movements to the equivalent of just one truck per signal cycle time. Assuming (conservatively) that each intersection operates with a cycle time of 120 seconds, this translates to 30 trucks being able to travel through the intersections per hour. These movements will be controlled at the construction site, and appropriate provisions developed in the CTMP to manage departures at the Freight Drive egress to 120 second intervals.

The assessment has not identified a need for mitigation works along parts of the route to provide for the safe travel of truck and trailer units (23m length). This outcome arises for two reasons. First, the recommended outbound haulage route follows the Principal Road network on which such vehicle types and additions can reasonably be anticipated. Secondly, the otherwise greater effects have been mitigated by the proposed restrictions on haulage hours and truck volumes.

### 7.8.3.3 Beyond the Haulage Routes

On SH1 and SH2 the effects of haulage trucks are suitably mitigated by the recommended haulage hours and restricted truck volumes.

### 7.8.3.4 Summary

Overall, the effects of adding haulage trucks are considered to be suitably mitigated by the proposed haulage hours to avoid traffic peaks and the utilisation of available road capacity during off-peak periods.

## 7.8.4 Assessment of Effects - Road Safety

An analysis of the NZTA crash records was undertaken for the urban roads and state highways of the proposed haulage route to determine the potential safety effects arising as a result of increased heavy vehicle traffic on the network. The analysis shows that the rate of reported accidents involving heavy vehicles is elevated during peak hour morning and evening periods, as compared with the transport window proposed. This reinforces that it is appropriate to restrict haulage vehicles during peak transportation hours.

There are no identified existing safety issues on the state highways and Principal Road routes that need to be addressed to facilitate truck haulage for the proposed runway extension. That said, local traffic control measures will be developed and implemented through the CTMP, including driver protocols where these are found to be necessary.

By utilising the transport windows and undertaking heavy haulage transportation on established primary routes, it is concluded that haulage trucks can be safely accommodated by the public road network in the manner proposed. Moreover, the CTMP will have a particular focus on safety, both on and off-site, and include provisions around the safe management of truck movements.

## 7.8.5 Assessment of Effects Traffic Generation

### 7.8.5.1 Construction Traffic Generation

Traffic will be generated by site establishment works, contractor and construction staff, and heavy vehicle (truck and trailer) movements arising from the haulage of fill and other materials to the construction site.

Site compounds will be established on land located adjacent to Stewart Duff Drive and Tirangi Road, on both the eastern and western sides of the existing runway. The peak workforce demands expected during the planned construction period is anticipated to approximately 50 staff on site at any one time. All staff parking will be accommodated on site and within the site compounds in formed hard stand areas.

Also as an early phase of works, parts of Moa Point Road are to be realigned to provide for construction of the bridge/tunnel underpass for the proposed new taxiway. The materials associated with these works will include the supply of road aggregate, prefabricated concrete units and the delivery of wet concrete by standard readymix concrete trucks. Haulage of these materials to the site has been factored into the overall estimated construction traffic generation.

Peak truck traffic generation attributed to building the reclamation works will result from the construction of the rock dyke, the reclamation platform, and delivery of rock and fill material, and subsequent removal of any surcharge material. The intensity of traffic generation from these key construction activities will be largely unaffected should changes be made to the intended construction programme. That is, there will be physical limitations relative to the rate at which materials are able to be received and processed on site. From time to time, some on site stockpiling may be appropriate. Any such instances of trucked material being stockpiled will occur within the recommended haulage hours and volumes on weekdays, with stockpiled material then able to be transported internally from the stockpile areas within the site compounds on Stewart Duff Drive to the runway construction site, without the need to use public roads.

With regard to truck deliveries it is estimated that:

- Up to 110 trucks per day will haul materials to the site through the first year of construction;
- Up to 200 trucks per day will haul materials to the site until two-thirds of the construction period has elapsed, during which time the filling and surcharging component of the construction will occur; and
- A reduced level of 75 trucks per day will haul materials to the site through the final stage of construction activity (Stage K).

It is important to note that there will be some variability around this profile to recognise daily and weekly variances in material demands on site. However these will be attenuated and managed as far as practicable by the traffic frequency controls proposed via conditions, complemented by the ability to stockpile materials on site.

The road network itself presents limitations as to the volume of trucks able to be accommodated. As discussed in the preceding section noise is also a limiting factor with regard to how many heavy vehicle movements would be acceptable during night time hours. As discussed above by applying a dual criteria analysis (traffic and noise limitations), the maximum daily truck volumes have been assessed to be as included below in **Table 7-11** for the respective day time (9:30am to 2:30pm) and night time (10:00pm and 6:00am) transport routes.

**Table 7-11: Maximum Truck Volumes per Hour on the Day Time and Night Time Haulage Routes**

Hour	Number of Trucks	
	Day Time (Figure 1-2)	Night Time (Figure 1-3)
9:30am – 10:00am	15	
10:00am – 11:00am	30	
11:00am – 12 noon	30	
12 noon – 1:00pm	30	
1:00pm – 2:00pm	30	

2:00pm – 2:30pm	15	
9:30am – 2:30pm	150	
10:00pm – 11:00pm		30
11:00pm – 12 midnight		25
12 midnight – 1:00am		25
1:00am – 2:00am		15
2:00am – 3:00am		5
3:00am – 4:00am		10
4:00am – 5:00am		20
5:00am – 6:00am		30
10.00:pm – 6:00am		160

On this basis, peaks of up to 310 trucks per day can be planned for, with no more than minor traffic capacity and noise effects.

Other routine traffic related to servicing and staff will occur each day, involving approximately:

- 20 standard single unit trucks per day (two to four per hour) for site servicing; and
- 40 cars / vans per day (15 per hour) for staff travel.

These routine daily vehicles will be accommodated (inbound and outbound) via the public roading network and Stewart Duff Drive (and Freight Drive), to and from the site compounds and the construction itself, and will not be subject to the truck haulage hours.

#### 7.8.5.2 Operational Traffic Generation

Once the works are complete the area will only attract occasional routine maintenance vehicles. These maintenance requirements will be very similar to the existing runway. Therefore little added traffic demand is anticipated for maintenance purposes.

In order to determine whether the proposed runway extension will have an impact on future vehicle numbers to and from the Airport, TDG analysed the InterVISTAs passenger forecasts under the BAU constrained runway option and compared these with the extended runway scenario using forecast data for future years 2030 and 2045.

**Table 7-12** shows the forecast busy hour vehicle trips for the Constrained BAU Runway option. These are shown separately for the inbound and outbound direction and for the combined two-way total, for the overall hour and on a per minute basis.

**Table 7-12: Forecast Busy Hour Vehicle Trips – Constrained BAU Runway Option**

BAU Option	FY2015	FY2030	FY2045	2030 Master Plan
Passengers (thousands)	5,457	7796	11553	10,500
Busy hour passengers	1388	1983	2939	2671
Busy hour inbound vehicle trips	1013	1448	2145	1950
Busy hour outbound vehicle trips	1069	1527	2263	2057
Busy hour inbound vehicle trips per minute	17	24	36	32
Busy hour outbound vehicle trips per minute	18	25	38	34

**Table 7-13** shows the equivalent forecast busy hour vehicle trips with the Runway Extension option.

**Table 7-13: Forecast Busy Hour Vehicle Trips – Runway Extension Option**

Runway Extension Option	FY2015	FY2030	FY2045	2030 Master Plan
Passengers (thousands)	5,457	8654	12072	10,500
Busy hour passengers	1388	2202	3071	2671
Busy hour inbound vehicle trips	1013	1607	2242	1950
Busy hour outbound vehicle trips	1069	1696	2365	2057
Busy hour inbound vehicle trips per minute	17	27	37	32
Busy hour outbound vehicle trips per minute	18	28	39	34

The following **Table 7-14** shows the increase in busy hour vehicle trips per minute that result from the Runway Extension option compared to the BAU Constrained option.

**Table 7-14: Increase in Busy Hour Vehicle Trips Comparison between BAU and Runway Extension Option**

	FY2030	FY2045
Busy hour inbound vehicle trips per minute	+3	+1
Busy hour outbound vehicle trips per minute	+3	+1

The Airport related road traffic increase averages around 0.2% per annum, compared to the BAU option, with a 2 – 3% change per direction overall to 2045.

### 7.8.6 Measures to Avoid, Remedy or Mitigate Actual or Potential Adverse Effects on the Transport Network

A range of methods are proposed to be implemented for the duration of the Project to ensure that the potential adverse transportation effects are appropriately avoided, remedied or mitigated. Overall it has been assessed that the roading network is capable of safely accommodating the traffic volumes likely to be generated during construction subject to the following measures:

- Haulage truck movements are restricted to the hours of 9:30am to 2:30pm, and 10:00pm to 6:00am Monday to Friday, on differing day time and night time haulage routes to avoid busy commuter traffic peaks, Airport traffic, school peaks, business peaks and weekends.
- Truck volumes are to be limited to a maximum of 310 trucks per day, spread across the day time and night time operating window and subject also to the maximum hourly rates shown in **Table 7-11**.
- A CTMP, applying throughout the construction period, will provide controls on the operational requirements of all construction related traffic travelling to and from the proposed construction site, and within the site. The plan will be prepared in consultation with, and will need to be accepted by, the relevant road controlling authorities.

With these measures in place, it is assessed that construction, operation and maintenance operations associated with the proposed runway extension and all associated auxiliary activities can be completed in a manner that would have no undue effect on the function, capacity and safety of the road network. TDG therefore concludes that there are no traffic or transportation reasons that would preclude the establishment of the proposed runway extension.



## 7.9 AIR QUALITY ASSESSMENT

This section discusses the potential air quality effects arising from construction of the proposed runway extension. The information contained in this section is based on the “Wellington Airport Extension Air Quality Assessment” prepared by AECOM, which is attached as **Technical Report 21**.

The potential air emissions arising from the proposed runway extension generally fall into one of two categories:

- Particulate or dust; and
- Combustion emissions from vehicle exhausts.

### 7.9.1 Existing Environment

Wellington Airport is located in a north – south orientated valley and is bound by the Cook Strait to the south and Evans Bay to the north. The surrounding ridges to the east and west are approximately 150m to 160m in height.

Air quality at the Airport is influenced by the prevailing meteorological conditions and topographical influences. Predominant winds measured at the Airport weather station<sup>40</sup> are from the north, north east and southerly direction.

### 7.9.2 Sensitive Receptors

Sensitive receptors are locations where people or surroundings may be particularly sensitive to the effects of air pollution<sup>41</sup>.

A number of sensitive receptors (specifically residential properties) have been identified within close proximity to proposed runway extension, the closest being 200m east of the proposed construction activities associated with the extension. To inform the assessment of air quality effects, a representative sample of ten sensitive receptors within 850m of the extension has been assessed. These are identified in Figure 3 of **Technical Report 21**.

A range of recreational activities also occur close to the construction site which have the potential to be affected by dust. Aircraft on approach and take-off are also considered sensitive receptors for the purposes of this assessment due to the potential for dust emissions to cause damage and increased wear on aircraft engines.

### 7.9.3 Source of Air Quality Effects

Like any large earth moving project, there is the potential for dust to be generated from a number of construction activities. These include:

- Initial site establishment, including construction of haul and access routes and removal of topsoil;
- Placement and compaction of fill material;

<sup>40</sup> Between January 2010 and December 2012.

<sup>41</sup> Examples include retirement villages, aged care facilities, hospitals, schools, early childhood education centres, marae, cemeteries, residential properties, other cultural facilities, and sensitive ecosystems.

- Operation of vehicles on access/site roads;
- Wind erosion of working areas; and
- Rehabilitation of completed areas.

There are four main factors that influence whether any nuisance is caused by dust. These include particle size, particle density, wind speed and wind direction. These factors are all interrelated and it is how they combine that determines the potential for an effect to occur.

The following section identifies the likely sources of dust emissions arising during construction of the runway platform.

#### **7.9.3.1 Site Establishment**

Earthworks associated with site establishment works, including the construction of offices and compounds, and removal of the hillock have the potential to generate fugitive dust emissions. The location of the proposed site offices and compounds is described in Chapter 1.

The Kingsford Street area is proposed to be sealed and has therefore been excluded as a potential source of dust emission for the purposes of this assessment.

#### **7.9.3.2 Placement and Compaction of Material**

During the early stages of the Project it may be necessary to construct stone columns under the rock dyke to improve ground conditions. Given that this work is occurring below sea level there is no potential for nuisance dust effects from this activity.

Similarly, the majority of the rock dyke is located below sea level and will be constructed from a damp quarry run which contains a range of material including small fines (typically <10% silts) which have the potential to result in air discharges. During the below sea level sections of the rock dyke there will be limited potential for dust emissions to occur.

Armouring will consist of a combination of large rock, selected aggregates and concrete accropodes. These materials are unlikely to generate any significant dust emissions while being placed, especially as the majority of this work will occur below sea level.

The placement of reclamation fill is considered to be the greatest potential generator of dust emissions for this Project. The initial placement of fill will be below sea level therefore is unlikely to give rise to dust emissions. Material deposited above sea level, particularly if sourced and transported overland, has the greatest potential to generate dust.

Dust emissions associated with stockpiling of construction materials and stripped top soil may also give rise to potential dust emissions.

### 7.9.3.3 Haul and Access Roads and Site Vehicles

Vehicles using unsealed access roads have the potential to give rise to dust emissions particularly if the roads become dry.

During site establishment, a sealed entranceway will be constructed from Freight Drive. Some dust emissions associated with the placement and compaction of base course as well as some potential for dust and volatile organic compounds (VOC) associated with the laying of bitumen to form the road may arise during its construction.

There will also be engine combustion emissions associated with on-site vehicles and the trucks delivering material to the site.

### 7.9.4 Assessment of Construction Air Quality Effects

To assess the potential for dust nuisance effects to arise from the aforementioned emission sources, the FIDOL (frequency, intensity, duration, offensiveness, location) assessment technique was employed. This is discussed in detail in the Air Quality Assessment report attached in **Technical Report 21**.

The Ministry for the Environment Good Practice Guide states that dust nuisance effects are generally only experienced within 300m of unmitigated dust sources. This distance has been used to conservatively indicate the distance within which some level of dust effects may be experienced if no form of mitigation is used for the proposed runway extension. Dust mitigation measures will be implemented for the duration of the Project.

Five of the ten representative receptors are located within 300m of the potential dust sources identified in Section 7.9.3. These are all located to the east of the construction envelope at a distance of between 200 and 300m (refer to Figure 6 of **Technical Report 21**).

Only winds above 5m/s have the potential to cause dust nuisance effects to the nearest sensitive receptors if mitigation measures are not implemented. The frequency that wind is above 5m/s from the south west, west and north west that has potential to blow dust towards the five receptors is 2.4%, 0.3% and 3.6% respectively. Winds from the north that have the potential to blow dust from the construction compounds (specifically the Hillock and long term car parking) towards the five receptors is expected to occur 33.6% of the time. The frequency with which recreational users might be affected will depend on where the activity is being undertaken but could be similar.

Construction could be undertaken at any time of the day over a period of three to four years. Wind conditions will therefore be the primary factor in determining the frequency of dust emissions. It is considered that there is limited potential for off site dust nuisance associated with the works to occur with any significant frequency.

While the frequency of winds from the north about 5m/s occurs almost 33.6% of the time, the potential for dust emissions from unsealed areas within the construction compounds is very low, especially if unsealed areas are damped with water and replenished (as necessary) with fresh metal. The potential for nuisance dust at these locations is therefore low.

Aircraft approaching from the south and taking off from the north are considered to have the greatest potential to be affected by nuisance dust as they fly directly over the construction zone. When winds are from the south aircraft taking off would typically be expected to have climbed well above the construction area and therefore are unlikely to be affected by nuisance dust. Aircraft landing from the south during southerly winds will have completed the landing and would only move through the dust effects zone during the taxi back to the gates where engines are close to idle. Aircraft engines are therefore unlikely to ingest significant quantities of dust.

There may be some locations adjacent to the works at the end of the runway where recreational users may be present from time to time. Even with mitigation there is potential for recreational users such as fishermen or plane spotters (who are present for longer periods of time than cyclists or walkers) to experience dust effects if undertaking their activities immediately adjacent to the work area. The levels of dust experienced are not considered to give rise to nuisance effects.

Overall it has been assessed that there is some potential for unmitigated air discharges from the construction site to cause off site effects, primarily at locations within 300m of the site and on aircraft approach and take off from the south. As such, a number of mitigation measures will be implemented (as discussed in the following section) that will minimise dust emissions to within 50m of the source.

Emissions from construction vehicles are not expected to be significant and can be appropriately managed via the measures discussed in the following section.

### **7.9.5 Measures to Avoid, Remedy, or Mitigation Potential Air Quality Effects**

A CAQMP will be employed for the duration of the project to ensure that the air quality effects are appropriately avoided, remedied or mitigated. The CAQMP will set out dust monitoring and associated response requirements, as well as general procedures and methods for undertaking dust generating activities.

The measures that are recommended to assist in the mitigation of air quality effects include:

- Having a community liaison person who is available to deal with any neighbouring concerns or complaints relating to dust arising during construction activities;
- Installation of a dust monitor to ensure compliance with dust trigger values;
- Ensuring management measures to minimise the creation or potential for dust discharges including:
  - Limiting vehicle speeds on unsealed access roads;
  - Management requirements for stockpiles;
  - Damping of exposed surfaces via watercarts;
  - Wheel washes to prevent the transportation of material onto sealed surfaces where the material can become a source of dust emissions;
  - Sweeping of sealed surfaces within the construction area.

- Measures to reduce emissions from construction vehicles including:
  - Appropriate and regular engine maintenance;
  - Ensuring that tyres are inflated to the correct pressure;
  - Ensuring that the haul roads are appropriately maintained; and
  - Ensuring that vehicles are not overloaded.
- Having a comprehensive complaints procedure.

Providing the mitigation measures are appropriately implemented it is concluded that there is limited potential for dust nuisance effects from the Project.

## 7.10 EFFECTS ON NETWORK UTILITIES

This section discusses the potential network utility effects arising from construction of the runway extension. The information contained in this section is based on the “Runway Extension Project Concept Feasibility and Design Report” (and its accompanying appendices) prepared by AECOM, which is attached as **Technical Report 7**.

### 7.10.1 Existing Environment – Network Utilities

The following existing underground utilities may be impacted by the proposed runway extension:

- Telecom Duct;
- 11,000-V Cable;
- 400-V Cable;
- Stormwater Line;
- Dual 180mm concrete encased steel sewer line rising main;
- 20mm water main;
- Gas line; and
- Moa Point ocean sewer outfall.

The location of these services is shown in Drawing S5.0 of Volume II of **Technical Report 7**.

### 7.10.2 Assessment of Effects on Network Utilities

#### 7.10.2.1 Network Utility Capacity

All site compounds are located near existing utility networks, including potable water, sewer and stormwater supply. Electrical, telecommunications and fibre optic cabling are also available nearby. The capacity of these networks to service the site offices and compounds has yet to be determined. This will be confirmed during the detailed engineering and design phase of the project.

#### 7.10.2.2 Construction

Discussions with individual service providers have not taken place as to whether affected services will be protected at their current locations or diverted to different locations. Such discussions will occur during the detailed engineering and design phase of the Project.

#### 7.10.2.3 Moa Point Treatment Plant Outfall Pipe

The Moa Point Treatment Plant ocean outfall pipe extends approximately 1,870m from the existing shoreline, east of the current runway platform. The pipeline is a 1,265mm diameter steel pipe with a cement mortar lining and a 122mm thick concrete weight coating on its exterior.

Approximately 201m of the Moa Point treatment pipe, starting from a distance of 175m from the shoreline will be located under the new reclamation. As such, an evaluation



of the potential impact from the reclamation and rock dyke loadings was undertaken and concepts developed to protect the outfall pipe from the resulting load damages. Consideration was also given to the effects of rock and fill placement. The results of this evaluation are discussed in detail in Appendix O of **Technical Report 7**.

Preliminary discussions have been held with WCC, Veolia, and Wellington Water, who own and operate the outfall. The consolidation testing undertaken during the geotechnical investigations shows that the existing outfall will likely need to be bridged to protect it from the effects of the construction. The level of protection will require the pipe to stay in its current location (horizontally and vertically).

Possible options for the protection of the sewer outfall include a bulkhead wall instead of the dyke toe extending out over the pipe; pile-supported steel cage or concrete platform over the pipe; and, if necessary performing ground improvements under the pipe (such as deep soil mixing or jet grouting) to minimise settlements under the pipe. The final option will be confirmed during detailed engineering design.

### **7.10.3 Measures to Avoid, Remedy or Mitigate Actual or Potential Effects on Network Utilities**

All construction activities will be undertaken in accordance with a NUMP. The purpose of the NUMP will be to inform the Council and relevant network utility providers that the enabling work, design and construction of the proposed runway extension adequately takes into account the safety, integrity, protection and if necessary, relocation of existing network utilities.

The NUMP, and the matters that it shall include, will be secured by way of resource consent conditions.

## 7.11 CONSTRUCTION EFFECTS ON AIRCRAFT

This section discusses the potential effects of construction activities on the OLS. The information contained in this section is based on the “South Runway Extension Aeronautical Study” prepared by Astral, which is attached as **Technical Report 8**.

### 7.11.1 Existing Environment

The existing operational lengths of Runways 16 and 34 are outlined in **Table 7-15** below:

**Table 7-15: Current operational length of Runway 16 and Runway 34 at Wellington Airport.**

	Runway 16	Runway 34
TORA-m	1945	1921
ASDA-m	1945	1921
TODA-m	2300	2300
LDA-m	1815	1815
RESA undershoot-m	90	90
RESA overshoot-m	90	90
Approach OLS upslope	Not affected	2.0% clear
Take-off OLS upslope	1.6% clear	Not affected
Transitional OLS upslope	Not affected	1:7 clear

The current operational length of the Airport conforms to CAA aerodrome design standards. The location of the OLS relative to MSL is shown in Figure S.02 (Rev.4) of Appendix L of **Technical Report 7**.

### 7.11.2 Assessment of Effects – Obstacle Limitation Surface

The proposed runway extension works will result in construction activity and construction personnel and equipment at the end of the southern RESA (Runway 16 overshoot, Runway 34 undershoot). The height of the construction equipment proposed to undertake the works ranges in height from approximately 4.5m for low level barges and trucks to 23m for larger floating cranes. Ground level across the construction site (at the top of the dyke wall) is estimated to be 8.0m AMSL.

The height of the 2.0% Runway 34 approach obstacle limitation surface (OLS) at the southern extremity of the dyke wall is approximately 16.7m AMSL. Approximately 8.7m of clearance is therefore available before construction equipment would penetrate the OLS.

Parallel to the runway, the OLS clearance progressively reduces to 1.0m in height. This is inadequate for almost all construction equipment clearance.

Construction activity will have the greatest impact on the Runway 16 take off obstacle limitation surface. With a 1.6% upslope, at the point where the take-off surface centreline passes over the southern outer end of the rock dyke wall, its height is 14.7m, or 6.7m above the height of the dyke wall. If a 2.0% upslope is used the clearance height increases to 7.5m. At the sides of the dyke parallel to the runway, this clearance is reduced to approximately 3.6m.

### **7.11.3 Measures to Avoid, Remedy or Mitigate the Actual or Potential Effects of Construction Activity on the Obstacle Limitation Surfaces**

As described in Chapter 4, a number of construction activities will penetrate the existing Runway 16 take-off, Runway 34 approach and transitional obstacle limitation surfaces. In areas where penetrations occur, construction equipment must remain outside of the surfaces while aircraft are operating. This means construction must either be performed between aircraft movements or outside of the operational hours of the Airport.

Temporarily displacing the Runway 34 threshold will also increase the approach OLS over the works area. A temporary threshold displacement of 100m has been identified as the maximum viable displacement distance before operations are noticeably compromised and also the minimum distance to provide any appreciable benefit. In conjunction with the displacement, the approach surface could be steepened to 2.5% (1 in 40) as is permitted by Civil Aviation Regulations. The displaced threshold would however, not have an ILS glide path or lighting and markings. The following Airport operational conditions would therefore be required:

- Daytime hours only;
- Weather conditions (visibility) will be better than 1100ft - 5km;
- An instrument approach with glide path guidance to be available; and
- A full PAPI to be provided.

Table 7.16 shows the resulting configuration of the runway with displaced threshold and works occurring up to but outside of the OLS.

**Table 7-16: Resulting state with temporarily displaced threshold.**

	Runway 16		Runway 34	
	Existing	Proposed displaced threshold with	Existing	Proposed displaced threshold with
<b>TORA-m</b>	1945		1921	
<b>ASDA-m</b>	1945		1921	
<b>TODA-m</b>	2300		2300	
<b>LDA-m</b>	1815		1815	1715
<b>RESA undershoot (m)</b>	90		90	
<b>RESA overshoot (m)</b>	90		90	
<b>Approach OLS upslope</b>	Not affected		2.0% clear	2.5% clear <sup>42</sup>
<b>Take-off OLS upslope</b>	1.6% clear	2.0% clear	Not affected	
<b>Transitional OLS upslope</b>	Not affected		1:7 clear	
<b>PAPI</b>	Yes		Yes	
<b>Night operations</b>	Yes	no <sup>43</sup>	Yes	no
<b>ILS</b>	Yes		Yes	LLZ only
<b>RNP-AR</b>	Yes		Yes	
<b>RNAV(GNSS)</b>	Yes		Yes	
<b>Minima</b>	Per AIP or airline approval	1100ft-5km <sup>44</sup>	Per AIP or airline approval	1100ft-5km

The scheduled jet operating airlines have been consulted regarding the feasibility of temporarily displacing the Runway 34 threshold 100m to the north. No airline objections to the displacement were received on the understanding that the following additional conditions will apply and facilities will be provided for the displaced threshold:

### **Conditions**

- a) Day use only (to avoid the need for lighting configuration changes);
- b) 1100ft/5km visibility restriction (to avoid operating restrictions on operators that do not have RNAV(GNSS) with barometric vertical guidance capability).

<sup>42</sup> 2.0% may be provided for international arrivals

<sup>43</sup> No night ops if existing OLS is infringed

<sup>44</sup> Minima for displaced threshold operations

### **Facilities**

- c) A non-precision approach with vertical guidance (RNP or RNAV (GNSS) with barometric height guidance;
- d) Temporary touchdown markings or zone limit markers;
- e) A different runway designator, such as Runway 35, is used for the displaced threshold.

Qantas advised that its 737-800 operations may be restricted in landing weight on Runway 34 under wet runway conditions with the reduced landing distance from the displaced threshold. On review of these comments, Astral consider it could be avoided “on the day” by reversion to full runway length on pilot request for inbound international flights. This would be consistent with the international requirement for a 2.0% approach OLS.

On the basis of the consultation it is concluded the 100m displaced threshold can be implemented and operated safely, thereby minimising the “keep out” area for construction equipment.

#### **7.11.4 Assessment of Effects - Dust, Glare and Foreign Objects and Debris**

Dust and glare from construction activity, interference with ILS signals, and presence of heavy equipment in vicinity of taxiing aircraft will occur as a result of construction activity. A draft Method of Works Plan (**MOWP**) has been prepared to manage the effects of these on aircraft operations (refer **Technical Report 8**). This will be developed further in agreement between WIAL and airline operators.

Lighting of work areas may give rise to glare effects on passing aircraft. This can be appropriately managed through either restricting construction to daylight hours or ensuring that lighting is shielded from aircraft flight and taxiing paths. Due to construction restrictions resulting from the OLS, it is not practicable to limit construction works to daylight hours. Shielding will therefore comprise part of the MOWP.

Dust and other foreign objects and debris (**FOD**) can also have the potential to have adverse effects on aircraft, particularly in the locale of the Airport where strong winds conducive of such effects are often experienced. Dust (as described in Section 9.3 in relation to air quality) and FOD control measures will be implemented for the duration of the Project to ensure that such effects are appropriately managed.

#### **7.11.5 Measures to Avoid, Remedy or Mitigate the Actual or Potential Effects of Dust, Glare and FOD**

The MOWP will set out the management responses for dust, glare and FOD with respect to aircraft operations, and will include (but not be limited to) requirements to:

- Undertake regular FOD checks, including checks prior to the first flight each morning;
- Minimum buffers for construction equipment;

- Maintain a safety incident reporting system that records any safety incidents or observed hazards to aircraft operations;
- Liaison with stakeholders (including airlines).

Airlines should also be appraised of the MOWP and given the opportunity to provide feedback and suggestions on refinement.



## 7.12 ARCHAEOLOGICAL EFFECTS

This section discusses the archaeological significance and effects arising from the proposed construction of the proposed runway extension. The information contained in this section is based on the Archaeological Assessment attached as **Technical Report 22**.

### 7.12.1 Existing Environment

The existing runway is located upon an extensive land reclamation undertaken in the late 1950s (1959). Requiring in the order of 4 million cubic yards of fill material, the reclamation incorporated the small point then known as “Moa Point”. The former alignment of (old) Moa Point was generally in line with the concrete breakwater located to the south west of the existing runway configuration.

Early maps of “Watts Peninsula” (now the Miramar area) from 1872 suggest that historic artefacts could be found in the vicinity of the existing and proposed reclamation. Specially, kitchen middens were identified at the eastern end of Lyall Bay and Moa bones at Moa Point (from which the name “Moa Point” was derived). Later postcards from 1904 have also shown historic middens and umu in the area. These features have since been buried and/or destroyed by the 1959 land reclamation or by subsequent development and/or coastal processes occurring in the area.

A former historic sewer main dating back to 1895 traversed north east of the former coastline, towards the now present breakwater at the south western end of the runway. Being pre-1900, the sewer line may contain original elements such as brick vaulted or barrel drains and other features and is therefore defined as an archaeological site. The line would have been decommissioned in 1959 and was likely demolished or crushed during the 1959 reclamation works.

Other than those features identified above, searches of the early survey office plans, scientific papers, shipwreck site records, ARCHSITE and field investigations have not identified any other potential archaeological sites in the vicinity of the construction works.

### 7.12.2 Assessment of Archaeological Effects

The proposed works involve earthworks and disturbance activities that could potentially affect sites of archaeological significance.

Although early references to archaeological sites (including Moa bones and middens) have been documented, there are no visible remnants or signs of these features still existing today. As noted above, it is likely that they were buried or destroyed when the runway extension occurred in 1959, or possibly via later development or natural coastal processes.

It is possible that the former sewer line may be encountered during site establishment works, specifically the construction of the roading connection from Moa Point Road to the runway. It is likely however, that this is buried at some depth below any proposed earthwork activity.

### **7.12.3 Measures to Avoid, Remedy or Mitigate Actual or Potential Adverse Archaeological Effects**

In light of the above assessment of effects, it was concluded that there was no reasonable cause to indicate that any known archaeological sites will be modified or destroyed by the proposed runway extension. Notwithstanding this, an accidental discovery protocol will be adopted for the site and construction works to ensure that any unforeseen discoveries are appropriately managed during construction.

## 7.13 RECREATIONAL EFFECTS

This section provides an overview of the effects of the Project on recreational activities undertaken in and around the area. The information is summarised from the recreational assessment prepared by TRC (**Technical Report 6**).

### 7.13.1 Existing Recreational Activities

As set out in Chapter 3, Lyall Bay is popular for a number of recreational activities including walking, running, surfing, kite surfing and wind surfing, surf lifesaving, swimming, fishing from land, scenic drives, picnics, visiting cafes and plane watching. To the east of the Airport is the Miramar Golf Course. The CMA around Moa Point is also used for diving, snorkelling, fishing and gathering of seafood.

### 7.13.2 Assessment of Effects on Recreational Values

The assessment identifies that recreational activities could be affected during both the construction and operation of the proposed runway extension. During construction the potential effects are identified as:

- Discharges of sediment affecting water clarity and contact recreational activities;
- Effects on marine ecology and the quality, abundance and catchability of marine species in and around Lyall Bay;
- Heavy traffic movements on roads around Lyall Bay and the Airport; and
- Noise from construction activities.

Operationally recreational activities could be affected by:

- Changes to wave heights within Lyall Bay;
- Changes to access to the CMA around the extension;
- Aircraft noise.

A discussion of these actual or potential effects follows.

#### 7.13.2.1 Sediment Discharges and Effects on Turbidity

The process of filling and dewatering the reclamation has the potential to release fine material into the sea, temporally altering the clarity of the water in and around Lyall Bay. Changes to water clarity may affect the amenity for contact recreational activities in the CMA, such as swimming and diving.

An assessment of the sedimentation modelling undertaken by NIWA indicates that any temporary discharges of sediment are not expected to extend so far as to alter the water clarity for those using the designated swimming area in Lyall Bay (refer to Figure 11 of **Technical Report 6**). Furthermore as discussed above erosion and sediment control measures are to be incorporated into the construction methodology as outlined in the ESCP which will seek to minimise any potential turbidity effects beyond a zone of reasonable mixing (150m from the discharge points). Monitoring of turbidity levels will also be undertaken, and if any exceedance of the specified levels is detected

appropriate action will be undertaken to firstly identify the likely cause and to implement remedial or mitigation measures as necessary.

### **7.13.2.2 Marine Ecology**

During construction of the proposed runway extension, a temporary exclusion zone is proposed which will extend out to approximately 300m into the CMA. Public access for recreational pursuits including fishing and the gathering of seafood will not be permitted within this area, due to potential safety conflicts with construction machinery and activities. This has a temporary displacement effect on these recreational and cultural activities. Outside this area, the effects of the proposed construction activities on marine ecology is not expected to be adverse.

Within the footprint of the proposed runway extension, a portion of the CMA and associated habitat for aquatic species will be lost. This area is not considered to be particularly significant for any fishing, diving or seafood gathering and once construction is completed, the mitigation measures that are proposed will seek to have a positive effect on shellfish populations and other marine biodiversity around the extension.

### **7.13.2.3 Construction Traffic**

Heavy vehicle movements on Moa Point Road and Lyall Parade in particular, have the potential to adversely affect walking and cycling amenity along these routes. Given this, measures to avoid or mitigate potential conflict with recreational users have been incorporated into the proposed haulage route. This includes avoiding construction haulage traffic during peak commuter periods (early morning and late afternoon) and during the weekend.

### **7.13.2.4 Construction Noise**

Construction noise could also potentially affect the amenity and enjoyment of use of the surrounding area for recreational pursuits. Recreational users will however generally only be present during daytime construction hours, and will mostly likely be transient (i.e. walking/running, or cycling past). Ambient noise levels during daytime hours in the existing environment are already quite high due to the presence of aircraft and the sea and this will assist to mask noise from the construction activity and haul route traffic. Furthermore, the noise assessment assesses that during such daylight hours the standards specified in the construction noise standards (NZS 6803:1999) will for the majority of the time achieved.

Those exposed most to construction and haul traffic noise are likely to be visitors in parked cars along Moa Point Road who are watching aircraft and/or surfers/wind surfers/kite surfers and walkers and cyclists passing through Moa Point and along Moa Point Road. In these cases it is the noise from haul traffic that will be most noticeable during the day. There are no heavy haulage movements planned for weekends.

Construction noise effects on recreational activities within the CMA beyond the proposed 300m exclusion zone are not expected to be adverse.

### 7.13.2.5 Changes to Wave Heights within Lyall Bay

As discussed above, the surf break 'Airport Rights' is within the proposed footprint of the reclamation and will be lost as a result of the extension. For other surfing locations within Lyall Bay ("The Corner", Middle Beach and West Beach) the extension is predicted to reduce "wave peakiness" (which enables the wave to break on a peak and then be rideable).

With reference to the recreational assessment (refer **Technical Report 6**), "Airport Rights" is a surf break which is only utilised a few times a year during certain conditions by experienced surfers. The loss of this surfing amenity will therefore only affect a small group of expert surfers. The possible reduction of wave rides at "The Corner" is likely to only be noticeable by the most seasoned and experienced surfers who have surfed "The Corner" for many years.

### 7.13.2.6 Public Access, Fishing and Diving

Effects on public access are intended to be mitigated by enhancements to the Moa Point Beach amenity and improved public access opportunities in this locality. Ecological enhancement and habitat recreation is also expected to advance the recolonisation of benthic communities that may contribute to fishing and diving opportunities in the immediate area.

Access will also be provided for on the eastern side of the runway extension from a new bay coastal landscape with a 'rock hopping' type path. The path will not be flat, but use placed steps of rock/concrete to provide an access only for fully able users given the more natural landscape on the east side of the runway. It is noted however that this is subject to further assessment on the public safety and aeronautical risk with enabling access in this locality.

### 7.13.2.7 Aircraft Noise

Operational effects of use of the proposed runway extension are unlikely to have any noticeable effects on recreation amenity considering the existing noise environment and the predicted scale of change.

## 7.13.3 Measures to Avoid, Remedy or Mitigate Actual or Potential Effects

The assessments conclude that the proposed runway extension does not appear to threaten the value or use of Lyall Bay for recreation, however it is recommended that mitigation to address potential conflicts during construction are employed. These measures relate to the management of construction traffic and noise and have been discussed in Sections 7.7 and 7.8.

The loss of "Airport Rights" surf break and the area used for kai moana gathering off the end of the existing runway are localised losses, affecting a small group of recreationalists. Mitigation measures proposed for improving marine biodiversity would also have a positive effect for kai moana, fishing and diving activities in the long term.

The loss of "Airport Rights" surf break and the reduction in wave heights in other areas of Lyall Bay is proposed to be mitigated via the submerged wave focussing structure as described in Section 7.3.

## 7.14 URBAN DESIGN

This section provides a summary of the assessment of the proposed runway extension on urban form and function, drawing on the Urban Design Assessment of Effects report, prepared by Boffa Miskell Limited (refer **Technical Report 23**).

### 7.14.1 Existing Environment

The Urban Design Assessment (refer **Technical Report 23**) describes various elements of the existing environment surrounding the Airport which contribute to the current urban design of the area. This includes a description of the key land use and features of the built environment, the movement networks (i.e. road, pedestrian, and cycle ways), and the landform and elements within the coastal interface. It also includes a description of existing heritage features.

#### 7.14.1.1 Land Use and Built Environment

The report describes the principal land uses and building in the immediate area of the Airport as comprising:

- The Airport and existing runway itself (to the north) which includes open car parking areas, large hangar and commercial buildings (zoned Airport Precinct in the WCC District Plan);
- A coastal edge and small bay extending east toward Moa Point (Hue-te-taka) which includes a beach, rocky outcrops and low vegetation up to Moa Point Road (zoned Open Space B in the WCC District Plan);
- Moa Point Sewage Treatment Plant and large utilitarian structures on the lower slopes of the south coast escarpment immediately to the east of the airport (zoned Airport in the Wellington City District Plan but with a designation [#58]);
- A small enclave of one and two storey houses immediately to the east of the Airport at the toe of the south coast escarpment (zoned Outer Residential in the WCC District Plan);
- The area to the west and south of the proposed runway extension is the open water of Lyall Bay (Hue Te Para) and Cook Strait.
- Further away from the immediate surroundings of the proposed runway extension is the hilltop residential area (zoned Outer Residential in the WCC District Plan) which sits above and to the north east of the Airport on the Orongo Ridge (Kekerenga and Ahuriri Streets).
- Across Lyall Bay from the proposed runway extension is residential and commercial development including cafes and larger scale (two storey) warehouses and retail buildings which typically face onto the Lyall Bay Parade or the streets that connect to it. The Lyall Bay promenade is itself a popular recreational space.



### 7.14.1.2 Movement Networks

The principal street/road system in the immediate area of the proposed runway extension is Moa Point Road which generally follows the form of the coastal edge. The two lane road connects east to Breaker Bay Road which continues to wind around the south coast edge. Moa Point Road extends west and then north and prescribes the western side of the current Airport runway. Moa Point Road enters an underpass beneath the current runway and is a popular route for recreational users (cyclists, runners, sight-seeing and beach trips) as well as to connect suburban centres and residential properties around the south coast. As described in **Technical Report 9 (traffic)** counts in the order of 100 cycles on Saturday morning (9-10am) were recorded on Moa Point Road on the east side of the tunnel. On a weekday morning (7-8am) some 40 cycle movements are recorded here. Observations regarding the uses for recreational movements (cycling/walking/running) are described spatially in **Technical Report 23**.

The road is informal in its treatment (no curb and channel or sumps) to the east of the Airport and becomes more formal from the underpass west towards the more urban Lyall Bay.

The closest north to south connecting road which extends across the peninsula from the north coast (Evans Bay) to the south coast (Moa Point) is through the Airport land on Stewart Duff Drive. This is not a public road, but the gate system allows for public movements at no charge. Stewart Duff Drive is a popular route given this relatively direct connection and the turn at the intersection of Moa Point Road and the Airport Road is relatively busy (end of day peak in the order of 150 vehicles per hour almost all of which turning west).

Moa Point Road is also part of the south coast bus route. Buses operate on a weekday schedule only and at peak times run every 25 minutes.

### 7.14.1.3 Landform

The assessment describes that the relatively (for Wellington) flat landform has been influential to the resultant land uses and built environment. The Airport sits at the transition where the flatter isthmus of land that connects Kilbirnie to Miramar rises to form the Miramar Peninsula. As a consequence the land form west of the Airport is relatively flat (although historically dunes were removed to make way for the Airport itself and the suburb of Rongotai) and to the east is a steep escarpment.

The flatter land has enabled urbanisation and a supporting road network. The steeper land has seen little development on the escarpment, but the development of the ridgeline above. Moa Point Road winds along the coastline where the flatter platform of beach has enabled it and in places enclaves of buildings sandwiched between the escarpment and the road to the front.

### 7.14.1.4 Heritage

There are no listed heritage sites affected by the proposed runway extension but some remnant buildings and current land uses can be referenced back to several historical periods. Coastal defences, air travel and other features of historical urbanisation (such as the tram line which extended to Lyall Bay) are all described in the report as being

heritage features within the area. Maori sites of significance are located on points around the area as described in Section 7.6.

### 7.14.2 Assessment of Effects on Urban Design

The following assessment addresses potential adverse effects that the proposed runway extension may have on the existing urban environment, and provides recommendations in order to improve the current urban design of the area, and mitigate the potential adverse effects arising from the proposed runway extension on existing features.

The assessment of effects on urban design has been divided into the following subheadings:

- **Urban form and land use** – how the proposed runway extension may affect the existing and future form of Lyall Bay including surrounding residential communities and open space areas.
- **Connectivity** – how the proposed runway extension may affect air travel and local road connections, and other forms of connectivity including pedestrian and cycle access around the area.
- **Amenity and Quality of the Environment** – how the proposed runway extension may affect the amenity values of people living adjacent (e.g. Moa Point) or within the surrounding Lyall Bay area.

The assessment has been informed by the relevant urban design policy and protocols which are described in **Technical Report 23**.

#### 7.14.2.1 Urban Form and Land Use

The Airport is influential within Wellington city's existing urban form. The Airport is conveniently close to the city's centre and the catchment of both business people and residents using it. The assessment describes that the Airport's position has long influenced decisions on the city form and growth. This influence includes planning of transport infrastructure and the way in which land uses have transitioned around the Airport with buffers to the east (golf course) and the interface with residential properties to the west (Bridge Street).

The decision to retain the Airport in the current location is one that has been cemented each time it has been considered. The convenience it represents to the city as a compact form is significant - providing quick and easy access to the city centre and the user catchment. Continuing to develop the Airport, and as part of this the proposed runway extension, is consistent with the planned urban form of the city and its projected growth in nodal centres (at Kilbirnie) and transportation network. It is noted that the location of the Airport is an integral part of the draft Wellington City Growth Plan 2014.

In a physical and topographical sense the Airport has been influential to the environment in which it has been located. The change to the natural environment that existed (coastal dunes and curving bay form) has been dramatic (refer to **Figure 6 of Technical Report 23**). The early establishment of the Airport was within the context of

an already growing residential suburb. Successive extensions or changes have occurred within that context and various adjustments have been made to accommodate the Airport's operation over time. These adjustments include the acquisition of houses on Bridge Street by the Airport in agreement with owners to address changes in the noise environment from the Airport's operation, and relocation of the heritage Aero Club building to Lyall Bay Parade for reuse as a cafe to allow for Airport activities to expand to the west.

#### **7.14.2.2 Residential Enclave Context (Moa Point Road)**

From an urban design perspective, the assessment considers that on the adjacent residential enclave on Moa Point Road are the most significant of the effects on land uses in the area. During construction, noise and other construction activities will likely reduce the current amenity that is experienced at these properties. In the longer term the visual amenity experienced at these properties will be altered with a view of the proposed runway extension.

Effects generated from the construction of the runway extension could be mitigated by temporary relocation of residents, or through acoustic insulation. A suitable package will be developed in agreement with the affected party. It is noted that property purchase is also a possibility if this can be agreed between owners and WIAL.

#### **7.14.2.3 Open Space Context and Character**

The zoned open spaces of the coastal edge in the location of the proposed runway extension are affected to the extent that the development will impact on the beach to the east and the land currently zoned open space off the end of the current runway. The assessment finds that there are opportunities to improve the values of these open spaces.

The assessment considers that the proposed runway extension presents an opportunity to enhance the beach interface with the Airport and improve on the visual and ecological values of the east side of the proposed runway extension. A beach reinstatement with rocky shore that can be colonised by seaweeds, allows a better habitat for fish and other marine life. The positioning and materiality of rock and accropode elements can be used to promote improved ecological performance in the beach and bay. This is supported by the Ecological Effects Assessment as discussed in Section 7.4.

It is also identified that the open space values of the Lyall Bay side of the proposed runway extension can be enhanced through the addition of improved walking access and connections to the Lyall Bay Parade. The development of a shared (walking and cycling) pathway along Moa Point Road alongside the western straight sided edge to the Airport on the west side would add significantly to the open space experience of Lyall Bay.

The form of the proposed runway extension itself and its fit within the existing environment has been discussed above. There are no feasible opportunities for the entire proposed runway extension to be formed as a natural coastal edge as this would require additional coastal areas to be reclaimed to generate the natural slope of the land into the sea.

The transition from the more urban coastal side of the Airport to the west at Lyall Bay to the more natural open space of the east side of the Airport will be enhanced by the treatment of the east side as a more coastal character ecological habitat setting and the more structured landscape on the main bay side.

#### **7.14.2.4 Connectivity**

Connectivity in this context means the functionality and quality of the physical connections between the multiple places people need to access for their use and enjoyment of the area.

At the broadest sense the Project enhances the connectivity from Wellington to the world by enhancing the air transport options and choice for people from New Zealand to travel to other countries. It also enhances the opportunities for people from other parts of the world to connect with Wellington with consequent economic, cultural and social benefits.

At the local level there is opportunity to enhance the connectivity to the coastal edge by providing a new shared path alongside the existing Moa Point Road from Lyall Bay Parade as well as on the east side of the proposed runway extension on the sheltered bay side. Platforms down to the water will provide sitting positions.

The existing underpass from the east to west side of the runway will be enhanced with better lighting to assist the recreational connection and extension of the recreational amenity from the open more urban Lyall Bay coastal area to the more natural sheltered bay to the east of the Airport.

#### **7.14.2.5 Amenity Improvements**

Aside from the amenity provided for and considered above in relation to connectivity, it is also planned to make improvements at the intersection of the Airport Road and Moa Point Road. These “gateway” improvements will result in an enhanced landscape that recognises this intersection point’s importance as one of a string of ‘nodal’ intersection points along the south coast.

### **7.14.3 Measures to Avoid, Remedy or Mitigate Actual or Potential Effects**

The assessment recommends that in designing and constructing the proposed runway extension the following elements are incorporated in order to mitigate or offset adverse effects on urban design features. The mitigation elements are set out below:

- New shared path on the ‘urban edge’ side of the runway along the straight section of Moa Point Road which extends the promenade of Lyall Bay Parade with associated seating platforms;
- New beach recreation at the junction of the extension (existing and new extension) in the bay to the east which includes ecological habitat enhancements and a potential path to a view point along the proposed runway extension edge out in the bay;

- A new gateway landscape at the intersection of the Airport Road and Moa Point Road which can include reference to Iwi cultural values in design process; and
- Enhanced lighting to improve the comfort for cycling and walking through the underpass(s).

## 7.15 LANDSCAPE EFFECTS

### 7.15.1 Introduction

This section summarises the findings of the assessment of the proposed runway extension with respect to its effects on landscape, drawing on the assessment of landscape and visual effects prepared by Boffa Miskell Ltd. This report is attached as **Technical Report 24**.

### 7.15.2 Existing Environment

To assess the landscape and visual effects of the Project, an understanding of the existing landscape and visual environment is required. The following provides a short description of the existing landscape context and visual amenity of the environment.

#### 7.15.2.1 Landscape Context

Wellington Airport is situated in Lyall Bay which is on the south coast of Wellington city. It is located on the Rongotai Isthmus, the tract of low lying area of land between Kilbirnie and the Miramar Peninsula. This tract of land is, in geological terms, very recent and it was formerly a shallow tomobolo that has filled up. The former Miramari Island (Motu-Kairangi) was separated from the mainland and a second harbour entrance was situated between the Miramar Peninsula and Kilbirnie. The combined effects of sediment accumulation and uplift eventually joined the island to Kilbirnie, creating the Rongotai Isthmus.

The Lyall Bay landscape encompasses the bay and sea, the beach, the reefs, the headlands that defined the eastern and western edges of the bay, the immediately adjoining elevated land, and the Rongotai Isthmus.

In a broad landscape context, the Airport and its infrastructure, together with adjoining developments have all contributed to substantial modification of the landscape on the eastern side of Lyall Bay. While the remainder of Lyall Bay Beach is still largely intact, residential and recreational development and associated roads and infrastructure has modified all but the seaward fringe of the remnant dunes, which are now contained by a sea wall, a road and residential and commercial buildings. Lyall Bay Beach is popular for swimming, surfing and surf lifesaving.

The modifications of Lyall Bay have occurred in relation to both the landscape and seascape, and the development of the Airport has affected both these areas through modification of significant areas of the original landform, beach, reefs and seabed.

Whilst the landward side of Lyall Bay is not considered to be a natural landscape, there are however natural features present. The sea, waves and tidal action are major defining elements, as are the sandy beach, the fringe of reefs, and the unbuilt headlands of Te Raekaihau on the west and Palmer and Hue te Taka Peninsulas on the east.

The headlands at the outer ends of Lyall Bay are distinctive and legible, and have strong open space values because of the absence of development. While the headlands are protected as reserves, the original native vegetation cover has long



been removed and has been replaced by a mosaic of young regenerating native species and exotic species. Throughout the whole of Lyall Bay landscape/seascape area there is very little native vegetation.

Lyall Bay and its environs are not considered to comprise an outstanding natural landscape or feature.

### **7.15.3 Methodology**

The landscape and visual assessment considers the proposed runway extension on the biophysical landscape, visual effects and effects on landscape character. To understand the magnitude of the effects on visual amenity, a series of representative viewpoints were selected located at varying distances from the proposed runway extension and an assessment was carried out. Selected viewpoints include residential properties, recreation areas, and from public and private roads. As part of the assessment, photographs were taken from each viewpoint to show the existing vista and a computer generated visual simulation produced to illustrate the changes the proposed runway extension will bring.

### **7.15.4 Assessment of Landscape and Visual Effects**

#### **7.15.4.1 Biophysical Effects**

The assessment of the proposed runway extension on biophysical effects considered the nature and significance that would arise from modifications to landform, coastal edge and vegetation. The assessment finds that Lyall Bay landscape/seascape is highly modified, and observes that the proposed runway extension will introduce further modification. This will generate localised biophysical effects in that a portion of the open sea water will be lost due to the reclamation of the CMA arising from the proposed runway extension. There will also be alteration to the overall form of Lyall Bay and also to the small embayment east of the current runway. However, the assessment notes that the overall biophysical effects are contained within the footprint of the proposed runway extension and limited when considered at the broader landscape/seascape scale, primarily because of the existing level of modification in the surrounding area.

The existing runway is not a natural element in landscape terms, but it is a key existing feature of Lyall Bay; and its form, particularly the rock-armoured eastern edge has already introduced a high degree of modification to the landscape/seascape. The southern end of the existing runway is constructed over a rocky reef that was known as Moa Point. The proposed runway extension will extend further over the reef and in terms of the seascape it will result in the loss of marine habitat. However the ecological assessment indicates that although a portion of the marine habitat will be lost, these species can be relocated and recovered through mitigation strategies to offset or enhance habitat post construction of the proposed runway extension.

The proposed runway extension will also be constructed out of materials (akmons and Accropodes) and elements that are similar to what is existing. One key difference is however the size of the element that are used as the external armouring of the extension. The existing akmons that are used as the external armouring weigh 11.5

tonnes and while many of these existing akmons are to be re-used to armour the more sheltered eastern face of the extension, the more exposed southern and western faces are to be armoured with between 24 and 34 tonne of Accropodes to provide a higher level of armouring (refer to **Figure 15 in Technical Report 24** which indicates the difference in size of the Accropodes and akmons).

Extending the runway to the south will also introduce changes to the form and configuration to the Moa Point embayment east of the extension and west of Hue te Taka Peninsula. The extent of rock armouring apparent in the area will be increased. While the eastern edge of the existing runway is mostly rock armoured, concrete blocks and other debris has been used to reinforce the existing runway/land interface and there have been incursions where the sea has undermined this edge (refer to **Figure 5a in Technical Report 24**). These incursions will be remedied as part of the proposed runway extension and the proposed rock armouring around the entire edge of the extension will result in the entire area having a generally uniform appearance.

Overall the assessment finds that the magnitude of biophysical effects will be moderate to high within eastern Lyall Bay. Within the wider Lyall Bay landscape/seascape area the effects will however be more limited and minor. As described later, the assessment also sets out proposed mitigation measures in order to assist in resolving some of the existing landscape and visual issues.

#### 7.15.4.2 Visual Effects

The assessment describes visual amenity as being a major component of overall amenity and therefore contributes to peoples' appreciation of the pleasantness and aesthetic coherence of a place. The assessment considered the effects of the visual change that the proposed runway extension would have on the outlook and views of the viewing audience.

The sensitivity of the viewing audience needs to be considered in the context of the degree to which change is apparent when assessing the significance of visual effects. This takes account of both the nature of the viewing audience and the nature of change within existing views when evaluating the overall significance of visual effects.

The first step of the assessment is to determine the extent of area within which visual effects would be apparent. The greatest discernible effects will occur close to the proposed runway extension and diminish and become less apparent at greater distances.

The visual analysis undertaken (Zone of Theoretical Visibility or Viewshed Analysis) shows that the surrounding hilly topography on either side of the Airport provides many vantage points of the Airport, including views of the area where the runway extension is proposed. However, because of the low profile of the extension, together with the angle of view, and the presence of intervening buildings, landform and vegetation, there are many areas from which the proposed runway extension would not be visible, particularly from areas within 2km. Where visible from locations greater than 2km the significance of visual effects tends to be mitigated by distance.

The assessment considers the visual amenity effects of the proposed runway extension on two groups. The first being the resident population, those who will have views of the proposed runway extension from their dwelling or immediate outdoor living area, and are typically the most sensitive. The second is the transient population, which is characterised by those who use the area for recreational pursuits, or use other public facilities in the area (public roads, walkways). Travellers on the inter-island ferries, fisherman in Lyall Bay area and air travellers are also included in this group.

Table 7-17 below provides a summary of the viewpoint assessment that has been undertaken by Boffa Miskell. It demonstrates that the greatest level of visual effect will occur for residents living along the Moa Point Road enclave east of the Airport. The proposed runway extension will be appropriately 180m from the closest dwelling; currently the closest dwelling is approximately 220m from the existing runway. The proposed runway extension will alter the outlook from these properties.

**Table 7-17: Viewpoint Assessment.**

Viewpoint	Location	Distance from Extension	Significance of Visual Effects
1	Beach, Moa Point Road	185 – 320m	Very high
2	Breakwater, Moa Point Road	160m	Moderate-high
3	Hue te Taka Peninsula	265m	High
4	Palmer Head	400m	High
5	Kekerenga Street, Strathmore	475m	High
6	Spruce Goose Café	900m	Moderate-low
7	Promenade, Lyall Bay Parade	1200m	Moderate
8	Arthurs Nose, Queens Drive	940m	Moderate
9	Waitaha Cove, Queens Drive	1200m	Moderate
10	Te Raekaihau Point	1300m	Moderate
11	Bunker Way, The Links, Strathmore	1000m	Low
12	Hornsey Road, Melrose	1600m	Moderate
13	Tirangi Road, Kilbirnie	1700m	Very low
14	Inverell Way, Seatoun	2300m	Low
15	Truby King Park, Melrose	2100m	Low
16	Mt Victoria Lookout	4500m	Low
17	Inter-island Ferry	~3000m	Very low

The assessment considers that the significance of visual effects will be higher from residential properties and from viewpoints close to the extension on the eastern side of the existing runway. In particular, the increased length of the runway will affect the outlook from residential properties on Moa Point Road and for some residents these visual effects are likely to be considered to be adverse and cannot be mitigated. There will also be high visual effects from adjoining open space areas and from the road itself, which is popular for drivers and cyclists. From locations and viewpoints beyond 500m from the proposed runway extension the visual effects will be in the moderate/high to lower categories.

#### **7.15.4.3 Effects on Landscape/Seascape Character**

The effects on landscape character relate to changes in land use (new or different activities), and changes to existing patterns and elements in the landscape, such as vegetation, water bodies, landform, and settlement patterns. Changes and/or modifications to landscape character can affect the overall amenity, or peoples' appreciation of the area.

For the purposes of the landscape assessment, the potential for effects on landscape character has been considered within the context of the whole of Lyall Bay landscape/seascape. This has been divided into two areas, to the west and east of the existing runway, based on distinctive differences in landscape character.

The significance of effects on landscape character will be different on the eastern and western parts of the Lyall Bay landscape/seascape. The proposed runway extension will have little effect on landscape character on the western parts of the Lyall Bay landscape/seascape. The open waters of the bay and the open sea will continue to have a major influence on the landscape character in this area. There will be alteration to one element, being the extension of the existing runway, but in terms of the overall composition of the western side of the Lyall Bay landscape/seascape area, the change (introduction of the extension) will be similar to what already exists.

The proposed runway extension will have the greatest effects on landscape character within the small embayment on the eastern side of the Lyall Bay landscape/seascape area. While the proposed runway extension will have a low profile with the form and scale of development, and the akmons/Accropodes providing a strongly defined edge, it will modify the overall composition of the existing area.

The effects on landscape character will also be greatest during the construction phase, which will affect a larger footprint than the finished extension, and will involve provision of access points to the site and storage of materials and plant, resulting in an overall increase in activity that will be visible in the area.

Once construction is completed and mitigation (discussed below) is incorporated it is considered that the effects on landscape character will be reduced as its overall form and design will be integrated with the existing runway.

#### **7.15.4.4 Summary**

The Project will extend the existing runway further out into the CMA. This will change the outlook from certain viewpoints and residential properties which currently overlook

the area from both the east (Moa Point, Strathmore Park) and west (Lyllall Bay, Houghton Bay) of the Airport. The visual and landscape assessment includes a detailed visual assessment, taken from a broad range of identified key viewpoints.

As one would expect, the most pronounced visual effects will arise from those living closest and with direct views to the Project site and those using public spaces in close proximity to it, especially to the east of the site. Moa Point residents will be most affected by the visual effects of the reclamation. On the western side, given that the form and design of the extension will be similar to what already exists, a high level of integration with the existing environment will be able to be achieved and the visual effects will generally not be significant.

### **7.15.5 Measures to Avoid, Remedy or Mitigate Actual or Potential Adverse Effects**

The assessment notes that there are a number of mitigation measures which have been incorporated into the overall design of the proposed runway extension which will in turn have a positive impact on landscape and visual amenity effects.

The mitigation measures include:

- Creation of, and improvement to, marine and terrestrial ecological habitats;
- Improved access and parking, including safety improvements for pedestrians and cyclists;
- Additional and improved recreational facilities and opportunities.

These mitigation measures are consistent with the open space, ecological and recreation aims and objectives of both the WCC and Greater Wellington.

#### **7.15.5.1 Improved Habitats**

As discussed, with respect to ecological impacts of the proposed runway extension (Section 7.4), the rock dyke to be constructed around the edge of the reclamation provides opportunities for habitat enhancement within the interstices between and on the Accropodes. This will assist in the re-establishment of paua and kina populations that will be lost or disturbed by the reclamation.

The ecological assessment (refer **Technical Report 19**) also describes how biodiversity can be improved in subtidal zones in respect to micro-habitats. This would involve the addition of roughened/pitted surfaces on 50% of each Accropode to increase the range of micro-habitats available for colonising marine algae and invertebrates, together including five shallow indented prisms along the arm of each Accropode.

It is also noted that although it is unlikely that blue penguins are nesting in the rock wall at the end of the existing runway, there are opportunities to provide for increased nesting opportunities, post construction of the extension.

It is also proposed to improve the Moa Point Beach area by reinstating a beach and dune area through beach nourishment and vegetation plantings.

#### **7.15.5.2 Improved Access and Car Parking**

Moa Point Road is popular for cycling and a pedestrian route around the south coast. Its character along the eastern edge of Lyall Bay is however quite different to that of most of the rest of the south coast route; being more utilitarian and relatively featureless. As part of the proposed runway extension it is proposed to enhance the character of this area through a series of robust landscape enhancements that are able to withstand the often fierce south coast environment. It involves breaking down the scale of the approximately 720m long, 10m wide road through the use of different paving materials, creating a footpath along the western side of the road (i.e. adjacent to the sea) and constructing a clearly defined and safe route for pedestrians, including access through the underpass, which will be lengthened as part of the proposed runway extension.

Improvements for cyclists and also to both pedestrian and cyclist safety is also proposed. This includes a pedestrian crossing adjacent to the breakwater which will allow pedestrians to cross from the western side of Moa Point Road to the existing footpath on the eastern side which runs through the underpass. Improved lighting in the underpass is also proposed, which will benefit users.

#### **7.15.5.3 Recreational Facilities and Opportunities**

Recreational opportunities include the enhanced access and car parking described above, access to the water's edge by way of platforms set into a new armoured sea wall, and sitting/look out areas. As described earlier, the development of a SWFS is also proposed in Lyall Bay to mitigate the effects of the proposed runway extension on surf quality.



## 7.16 NATURAL CHARACTER

Frank Boffa, an independent landscape architect has undertaken an assessment of the proposed runway extension with respect to its effects on natural character. This report is attached **Technical Report 25** and the key findings are summarised below.

### 7.16.1 Existing Environment – Natural Character

The report describes existing natural character at two scales, a regional perspective and a more localised description of the values that exist in the immediate Lyall Bay area.

Wellington's south coast is described as a defining topographical element forming the boundary and edge to much of Wellington city. Narrow shore platforms backed by steep escarpments are typical of Wellington's coastline, where exposure to rigorous environmental conditions has helped shape the rugged landforms. Much of the coastline has been shaped by tectonic processes, some of which are relatively recent. The south coast has extensive areas of rocky shore and reefs which provide habitat for a range of species. The south coast is also popular for recreational pursuits such as fishing. The road extending around the south coast provides good access, and there are many small bays with residential settlements.

As described earlier in this report, the Airport is situated on the Rongotai Isthmus, the track of low lying area of land between Kilbirnie and Miramar Peninsula. The assessment observes that the development of the Airport, together with adjoining developments (wastewater treatment plant, Miramar Golf Club, residential housing, roads and infrastructure) have all contributed to a substantial modification of the natural character on the eastern side of Lyall Bay.

### 7.16.2 Methodology

The natural character assessment draws on the findings of the technical reports prepared by NIWA, characterising the physical and biological properties of Lyall Bay CMA and the wider south coast. The assessment also considers the terrestrial characteristics and experiential components of the CMA and coastal environment.

As a basis for determining levels of natural character, an integrated evaluation matrix was developed for both the terrestrial and marine areas. The characteristics considered to be relevant to this particular assessment were identified and evaluated under their respective attribute headings, being "physical", "biological", and "experiential". The assessment explains that natural character is to be assessed over a continuum extending from highly natural (pristine) to totally modified. In those areas ranked as being of very high or high natural character, there is a lesser degree of tolerance for any changes or modifications to occur. Where the levels of natural character are lower, the thresholds for accommodating change become more acceptable due to the fact that these predominately modified environments already have lower levels of natural character.

The assessment considers the level of natural character for the terrestrial and CMA components separately. Each of these components include physical, biological, and

experiential attributes and utilises a matrix evaluation guide to rank the level of natural character on a seven point scale (ranging from very high through to very low).

The report explains that the assessment of natural character and effects as a result of construction of the Project, also needs to be considered in relation to scale. The assessment considers the impacts on the terrestrial and marine coastal edge in close proximity to the existing Airport, it also considers Lyall Bay as a whole and in context of the south coast.

### **7.16.3 Assessment of Existing Natural Character – South Coast**

At its broadest scale, the Wellington south coast is perceived as being ‘wild and natural’, and these and similar terms are regularly used to describe it as a whole. The low level of development over much of the south coast is largely confined because of the narrow coastal platform and the ruggedness of the landforms. These aspects together with often extreme climate and weather events, and the recreation opportunities available, all contribute to the overall perception of isolation and wildness.

Overall, much of the south coast is assessed as having high natural character, with the area within and immediately adjacent to the Taputeranga Marine Reserve at Island Bay being assessed as having very high marine natural character.

### **7.16.4 Assessment of Existing Natural Character – Lyall Bay**

#### **7.16.4.1 Coastal Terrestrial Area**

In terms of natural character, the highest degree of naturalness occurs where there is the least amount of human induced modification. The stretch of the south coast environment, in close proximity to the Project, is highly modified by the land use development and activities that currently exist. These activities have significantly modified the form of Lyall Bay and the adjoining coastal margin. These modifications have also affected the perception of naturalness.

The assessment finds that the scale of modification within Lyall Bay is such that the natural character of both the terrestrial and marine environments have been reduced, although the terrestrial components more so than the marine. The assessment also confirms that there are no areas that are of outstanding natural character within the immediate or surrounding area of Lyall Bay.

#### **7.16.4.2 Physical Attributes**

The landform on the eastern side of Lyall Bay has been significantly modified, largely due to the construction of the Airport. Other development in the area have also contributed to this modification. The headlands on the eastern and western sides of outer Lyall Bay are the least modified areas and both Te Raekaihau and Palmer Head/Hue te Taka are zoned Open Space in the WCC District Plan.

While the remnant of Lyall Bay Beach is relatively intact, the seawall at the back of the beach cuts off the landward sand supply and inhibits any natural dune building processes. It is noted that some reforming of the dunes and revegetation has been carried out by WCC. There are also recreational and commercial buildings located along the middle section of the beach adjoining the sea wall.

The existing rock revetment forming the armoured edge running along Moa Point Road and along the Airport has also substantially modified the area. The coastal platform, east of the runway and also the formation of Moa Point Road and the enclave of residential dwellings has also modified this area. There is a narrow shingle beach situated in front of these houses, and foreshore reserve which has been planted and is well used by the community. The steep slopes behind these properties and on Palmer Head show few obvious signs of erosion and have been allowed to regenerate with pest animal and plant control undertaken by WCC.

The western side of Lyall Bay has also been modified by vegetation clearance, roading, residential development and infrastructure. However, the reef along the shoreline remains intact and the steep enclosing landforms of Te Raekaihau Point remain undeveloped.

#### **7.16.4.3 Biological Attributes**

The existing Airport is a significantly modified environment, and this area, as well as other built up areas do not support indigenous coastal flora and fauna communities. The original vegetation around the surrounding area has also been modified over time. Coastal birds have been recorded in surveys of the Hue te Taka Peninsula including little blue penguin, and there have been plantings of coastal flax and shrub communities to provide habitat for this species, as well as nesting boxes in Tarekana Bay and in other bays around the south coast. Geckos and lizards have also been recorded in this area.

#### **7.16.4.4 Coastal Marine Area**

As described above, the Lyall Bay shoreline has been significantly altered with urban and infrastructure development over many decades including the construction of the Airport. Discharges into the CMA arising from stormwater from these developments and treated wastewater from the sewage plant also occur. However despite this level of modification the NIWA assessments have found that the CMA in the immediate Lyall Bay, with respect to water quality and other biological attributes, is generally consistent with that found elsewhere in the south coast. Given the existing level of modification and activities occurring in the immediate area, seabirds and other marine mammals are not particularly abundant.

In terms of perceived naturalness, the assessment observes that there is a significant difference between coastal experiences obtained within Lyall Bay generally and the other parts of the south coast. The level of existing modification and consequential modification of the natural coastline has all contributed to this perception. Accordingly, the south coast generally has a higher level of perceived naturalness than Lyall Bay.

#### **7.16.5 Effects on Natural Character**

The assessment finds that although the natural character of the Lyall Bay area, and in particular the eastern shoreline, has undergone significant modification, the proposed runway extension will result in further change to the eastern shoreline and in particular the Moa Point area. These are described below.

#### 7.16.5.1 Coastal Terrestrial Area

As a result of the extension the small embayment to the east of the proposed runway extension will experience less wave energy, however in other parts of Lyall Bay the changes to the physical components will be subject to little or no change.

The effects on the biological attributes of terrestrial natural character will be unchanged and very low as no areas of habitat or flora and fauna will be adversely impacted apart from a small area of planting along the coastal edge along Moa Point Road. It is however proposed to mitigate this effect, by providing for more planting to replace and enhance terrestrial habitats.

The assessment finds that there will be adverse experiential effects in relation to the perception of the coastal environment within the immediate area. The proposed runway extension will result in biophysical changes in the eastern part of Lyall Bay and in this area the perceptual changes to natural character will be the greatest. The Moa Point area will become more enclosed, and the runway will be visible to residential properties situated along this area. All of these aspects combine to reduce the current experience of the embayment area. Mitigation measures such as improving the junction where the runway meets the land and improving the 'south coast gateway' with appropriate landscape and revegetation treatment will provide environmental improvements for residents and transient visitors to the area.

During construction of the proposed runway extension, the report also notes that there will be experiential effects on natural character given the effects arising from noise, lighting and the presence and activity of machinery. People's perception of the area, particularly those living in close proximity (i.e. along Moa Point Road) will be adversely affected, however these effects are temporary.

#### 7.16.5.2 Coastal Marine Area

The potential effects of the construction of the proposed runway extension on the abiotic and biological attributes of the CMA, have been described in the NIWA assessments attached as **Technical Reports 15 – 18** and Sections 7.3 – 7.4 above.

Based on these assessments, it is considered that abiotic factors within the immediate Lyall Bay and Moa Point embayment will be affected in a localised sense from the proposed runway extension. Specifically, there is likely to be localised reductions in tidal residual flows, wind driven currents, and wave heights. Localised changes in suspended sediments could also arise during construction of the reclamation.

With regard to potential effects on the biological environment, the main impact arises from the loss of habitat including soft bottom and reef habitats covering approximately 11 ha. However this effect is offset by a net gain in intertidal reef that will be created by the rock dyke and other ecological measures that will be incorporated to the overall design and construction of the rock dyke. Any other effects arising during construction on biological attributes are temporary and can be managed through appropriate sediment and erosion control measures.

In terms of experiential effects, the potential effects on wave patterns and heights may affect the perception of Lyall Bay as a popular and readily accessible surfing location.

However, this is to be mitigated by the proposed submerged wave focusing structure, which could broaden the perception and appeal of Lyall Bay as a surfing location catering to a wider range of surfing abilities.

The perception of Lyall Bay as a safe and accessible swimming beach may be temporarily affected. However, the effects of the proposed runway extension on swimmer safety is assessed as being negligible, and any negative perception is therefore likely to be short lived.

There will be an exclusion zone in place during the construction of the proposed runway extension, and this will preclude recreational fishing and public access, however these effects will be temporary. The paua and rock lobster fishery in the area will recover over time, as will recreational fishing for fin fish. The proposed mitigation measures will also assist in addressing experiential aspects, including providing new and improved recreational opportunities.

#### **7.16.6 Overall Conclusions on Natural Character**

The assessment observes that natural character of an area depends on the degree to which it has been shaped by natural processes. The highest natural character derives from the presence of natural elements with a natural distribution, arrived at primarily as a result of natural processes. At the lowest end of the scale are environments composed of the constructed elements of human domestic, civil and industrial life.

The proposed runway extension is within a location which is already characterised by a high degree of human induced modification, both in the land and coastal marine contexts. The current coastal edge is altered by the presence of the existing runway. It is considered that the proposed runway extension is therefore consistent with the existing development, and will therefore not give rise to any significant adverse effects on natural character values.

The greatest degree of change will however occur within the immediate Airport and Moa Point embayment area, where the overall natural character will be altered from low to very low adjacent to the Airport, and from moderate/low to low in the Moa Point embayment area. This is however not considered to be a significant adverse effect, and can in part be mitigated through improved urban design features, beach nourishment and planting, ecological habitat enhancement, and the proposed submerged wave focussing structure.

## 7.17 OPERATIONAL NOISE – POST CONSTRUCTION

This section provides a summary of the assessment undertaken by Marshall Day Acoustics with regard to aircraft noise effects arising from the proposed runway extension, which would enable the Airport to cater for larger and potentially louder aircraft than the existing situation. This report is attached as **Technical Report 26**.

### 7.17.1 Existing Aircraft Noise and Management

As discussed earlier in Chapter 3, the aircraft noise is currently controlled by rules in Chapter 11A of the WCC District Plan<sup>45</sup>. Noise from aircraft operations is controlled by a 65 dB  $L_{dn}$  noise limit at the ANB. It should be noted that the  $L_{dn}$  is representative of the daily (24 hour period) average noise exposure that will be experienced by the community from aircraft operations.

There is no Outer Control Boundary (**OCB**) for the Airport, and in line with the New Zealand Standard (NZ6805) – Airport Noise Management and Land Use Planning nor is there any control on single event noise levels from aircraft operating at the Airport, other than a  $L_{Amax}$  control that applies at night. This enables a limited number of quieter aircraft to operate during the curfew hours imposed for the Airport.

The ANB is based on modelled noise contours for a runway capacity scenario which includes approximately 402,000 annual aircraft movements. The capacity scenario includes four types of jet aircraft, along with a range of turbo-prop and general aviation aircraft. The model included 576 daytime and 55 night time jet aircraft movements per day.

Much of the land surrounding the Airport is hilly and this has an effect on how aircraft noise propagates to different areas in the community. Some areas are elevated and therefore closer to aircraft in flight and other areas are screened from the runway by hills. It is noted that when the ANB was developed the noise contours were calculated based on flat land, and a topographical screening adjustment was made manually to the calculated contour and it was also adjusted to fit around property boundaries.

In the late 1980s when noise levels surrounding the Airport reached up to 70 dB  $L_{dn}$ . Noise restrictions were introduced in 1995 and in the lead up to this, airlines made fleet changes that significantly reduced noise emissions. For example, the Boeing 737-100 was replaced with a British Aerospace 146 and hushkits were installed on the Boeing 737-200. These two changes alone reduced the overall  $L_{dn}$  noise level in the community by approximately eight decibels. Although the number of passengers at the Airport have been increasing, the introduction of quieter aircraft with more seat capacity means that the overall noise emissions have remained lower than historical levels.

Current aircraft movements are approximately 96,000 per year. There are approximately 80 daytime and 11 night time jet aircraft movements occurring at the Airport per day. The current jet aircraft mix includes Boeing 737-800 and Airbus 320 narrow body jets and the occasional Boeing 757-200 and 767-300.



Aircraft noise levels are measured continuously at two permanent monitoring stations located near the ANB. Results from these monitors indicate that the current aircraft noise is four to five decibels lower than what is allowed by the WCC District Plan.

### 7.17.2 Methodology

In order to assess whether future aircraft operations including the larger Code E aircraft on the proposed runway extension will be able to comply with the 65 dB  $L_{dn}$  limit at the ANB, Marshall Day Acoustics has calculated future noise contours for the year 2035 based on aircraft forecasts undertaken by InterVISTAS. In undertaking this assessment it is noted that the original noise contours for the Airport's ANB were generated in Integrated Noise Model (INM) version 4.11. Since this time there have been a number of upgrades to this software, and the current version for calculating the current and future noise contours is INM version 7.0d.

The 2035 forecast provides for 134,014 aircraft movements per year, and an average of 109 daytime and 14 night time jet aircraft movements per day are included.

Predictions of future aircraft noise have been calculated using the latest INM software. As explained in **Technical Report 26** the  $L_{dn}$  noise contours have been calculated for current aircraft activity using actual movements from 2015, and a future scenario for the year 2035 which includes the proposed runway extension. Details of the INM inputs for these two scenarios are contained in Appendix D to **Technical Report 26**. To assess the change in noise levels, 21 receiver locations were selected that are considered to be representative of the various residential receivers surrounding the Airport. Average noise levels for current and proposed aircraft activity have been predicted at these locations. Maximum noise levels from individual aircraft events have also been calculated.

### 7.17.3 Assessment of Operational Noise Effects

#### 7.17.3.1 2035 Forecast

The results from the 2035 forecast noise contour shows a localised one decibel exceedance of the current ANB to the west of the runway in the vicinity of Lonsdale Crescent, without adjusting for terrain related screening. A review of the records from when the ANB was developed noted the effect of screening was a reduction of two decibels in this location. Marshall Day Acoustics assessed terrain related screening in this location relative to the proposed runway extension and consider it again reasonable to apply a screening adjustment in this locality (due to the terrain and aircraft operations as a result of the extended runway), which would result in the 2035 contour lying inside the current ANB.

With regard to the 2035 forecast, it was also assumed that all Code E aircraft would operate during the day 7am – 10pm, however there is a possibility that a long haul service could arrive in the morning between 6am and 7am. A separate sensitivity analysis has been carried out to assess the effect of a daily arrival of an Airbus A350-900 before 7am. This had a negligible impact on the forecast 2035  $L_{dn}$  noise contour.

In summary, it is anticipated that noise from aircraft operations arising from the proposed runway extension will comply with the ANB, and for a sufficiently long period of time into the future before any changes to the current ANB will be necessary.

#### **7.17.3.2 Change in Noise Exposure**

The day/night average noise exposure ( $L_{dn}$ ) is considered to be the most appropriate parameter for predicting community annoyance and effects from aircraft noise. To quantify the change in noise exposure level for residents, Marshall Day Acoustics has calculated the difference in the current 2015  $L_{dn}$  and compared this to the predicted 2035  $L_{dn}$ .

In summary, the 2035 forecast levels range between naught to two dB higher than current noise levels. A change in noise levels of up to two dB is described as being barely perceptible to the human ear.

#### **7.17.3.3 Single Event Maximum Noise Levels ( $L_{Amax}$ )**

An assessment of the changes in maximum noise levels experienced as a result of individual aircraft events ( $L_{Amax}$ ) has also been undertaken. The Boeing 737-800 is the loudest aircraft currently operating regularly at the Airport and this forms the baseline for the assessment. It is noted however that the existing runway can accommodate Boeing 767-300 which operate on an infrequent basis, but the single event noise levels from this aircraft are no louder than the 737-800.

The assessment determines that the change in single event maximum noise levels compared with the current situation would range from a decrease in one decibel to an increase in four, depending on the receiving location. Subjectively this would be an imperceptible to just perceptible change.

It is noted that Code F aircraft are not included in the 2035 forecast, however these aircraft could operate as result of the proposed runway extension. Preliminary analysis shows that the only Code F aircraft (Airbus A380) would be no louder than the 777-300 ER and therefore it is considered that the effect of Code F operations, if they were to occur, would not result in any significant noise impacts on the community, compared to the current situation.

#### **7.17.3.4 Night Time Noise Effects**

The period from 10pm – 7am is when the potential for sleep disturbance effects arising from noisy activity is likely to be most disruptive. The partial curfew at the Airport means that under normal circumstances there are no passenger jet operations between 1am and 6am. However, it is noted that between 10pm and 1am and 6am and 7am (night time shoulder periods) there is the potential for aircraft movements to disrupt sleep.

Currently the loudest aircraft operating regularly during the night time shoulder periods at the Airport is the Boeing 737-800. In the 2035 forecast, narrow body jets such as the 737-800MAX and Airbus A321NEO continue to operate during these periods. There is potential for Code E aircraft to also operate during the night time shoulder periods, and the ANB provides capacity if this was to occur. The single event noise levels arising from these operations has also been assessed. The current WCC District Plan rules allow the Airport to operate international departures until midnight and

international arrivals until 1am which is based on the different noise characters of these flights.

During these night time shoulder periods, Code E departures would be around four decibels louder than current international departures, and arrivals would be up to six decibels louder than current arrivals. While the assessment finds that there is the potential for a noticeable increase in single event levels for international arrivals during these shoulder periods, it is determined that this would not comprise a significant adverse effect. However if this operation is to occur Marshall Day Acoustics recommends engaging with the Air Noise Management Committee to quantify the effect and establish appropriate methods for managing the impacts of this change on the community.

#### **7.17.4 Overall Assessment of Operational Noise Effects**

The assessment finds that the average aircraft noise exposure levels as a result of the proposed runway extension are predicted to increase by up to two decibels over the next 20 years. This change is barely perceptible and the noise levels would still be within the current ANB for the Airport. The change in single event maximum noise levels arising from the larger aircraft would also not be significant.

Code E aircraft are not expected to operate during the night time shoulder periods at the Airport, however if they do occur, the worst case single event noise levels would not be materially different to existing levels except between midnight and 1am, where the effect could be noticeable. If Code E arrivals aircraft are to be scheduled between midnight and 1am, it is recommended that the Air Noise Management Committee which is currently in place, oversees a community engagement and impact review process to manage the potential noise effects.

The assessment concludes that the proposed runway extension will introduce a small number of only just perceptibly louder aircraft that will not be significant in amongst the general level of aircraft activity. The overall increase in noise level would be barely perceptible and within the level allowed by the WCC District Plan.

## **8. MITIGATION METHODS AND MONITORING OF ENVIRONMENTAL EFFECTS**

### **8.1 INTRODUCTION**

The assessment of effects in Chapter 7 identifies a range of actual or potential environmental effects that will, or are likely to arise as a result of the Project. This chapter describes the measures that have been recommended by the various technical specialists to mitigate the actual and potential adverse effects of the Project.

The preliminary construction methodology and programming developed for the Project, as described in Chapter 7, has enabled the scale and nature of the environmental effects associated with the Project to be understood and assessed. Measures to avoid, remedy or mitigate potential adverse effects on the environment have been incorporated into the Project. As explained below, the key to the mitigation of effects is the development and implementation of a suite of measures that include conditions of consent, the preparation and implementation of management plans, environmental monitoring and ongoing maintenance requirements.

### **8.2 SUMMARY OF ADVERSE EFFECTS AND MITIGATION PROPOSED**

Broadly, the actual or potential adverse effects identified by the technical assessments as described in Chapter 7 fall into one of two categories. The first being those effects generated by the construction of the runway extension including the rock dyke, bulk fill or infilling of the reclamation, and other associated structures and activities, and the second relating to its ongoing operation.

Construction related amenity effects (such as traffic, noise, dust and visual effects) are temporary, but could generate annoyance or nuisance type effects particularly on those living in close proximity to the construction activity or the proposed haulage routes.

WIAL has endeavoured to work with its experts and the affected community in order to develop an appropriate response or strategy to manage or reduce the severity of these potential amenity effects. Where practicable, WIAL has sought in the first instance to avoid the potential generation of adverse effects, for example the proposed haulage route accessing the construction site has been reconfigured in response to community concerns.

WIAL will also continue to work with those directly affected by construction related effects to develop an appropriate mitigation response. As described in Chapter 7 this could include acoustic treatment of properties, and/or the temporary rehoming during particularly noisy or busy construction periods. For those closest to the construction site (e.g Moa Point residents) WIAL has made an offer to property owners to purchase their property should the consent be granted and construction is confirmed.

Construction of the rock dyke and infilling of the reclamation is likely to give rise to effects on the CMA. Loss of habitat directly beneath the construction site is unavoidable, and it is proposed to mitigate or offset this loss by the creation of habitat, as explained in Chapter 7, to encourage or enhance recolonisation by affected species on the new reef area.

Temporary sediment discharges will be managed by installing appropriate sediment control measures as part of the construction methodology and adhering to a suspended sediment limit which has been developed taking into account the known tolerances of aquatic species. Monitoring and/or remediation action is specified to address situations where discharge limits are exceeded. Best practice construction methods will also be adopted in order to reduce the likelihood of the construction activity affecting larger marine mammals, fish or birds.

The construction methodology accounts for the fact that the Airport must remain fully operational during the construction of the proposed runway extension and a MOWP has been developed in response.

Ongoing effects arising from the proposed runway extension relate to landscape and natural character changes, potential changes to surfing amenity and the potential for increased aircraft noise arising from the operation of larger aircraft in and out of the Airport.

The site is not in an area that is of outstanding natural character, as substantial modification of the coastal environment has already occurred with the existing development of the Airport, and surrounding urban land use activities. The most affected in terms of visual effects are those who live within close proximity to the existing Airport in particular the Moa Point resident. As the distance from the proposed runway extension increases, the visual effects are mitigated by existing development, topography of the foreground or background, and the large expanse of coastal water and other views that remain. The effects on natural character and landscape are however mitigated somewhat by the proposed urban design and landscape enhancements that are to be incorporated into the final design of the proposed runway extension and surrounding area.

The effects on surfing amenity within Lyall Bay as described in Chapter 7, are to be mitigated or offset by the proposed SWFS. The features of this are described in Chapter 4.

The assessment of operational noise has confirmed that aircraft operations post construction of the proposed runway extension will continue to comply with existing District Plan limits, and no further mitigation is necessary. Ongoing monitoring to confirm compliance with these limits will be undertaken, as per the current situation.

A summary of the approach taken to the management of these effects and the recommended mitigation, remediation and/or monitoring arising from the technical assessments is provided below. Where it is possible to do so, the method has been secured by way of a proposed draft condition. The conditions are set out in Section 8.5 below.

### 8.3 APPROACH TO THE MANAGEMENT OF EFFECTS

As set out in Chapter 7 the findings of the technical assessments have concluded that in some cases the actual or potential effects of the proposed runway extension are such that mitigation, remediation and/or monitoring is necessary. It is proposed that the suite of proposed mitigation, remediation and monitoring measures are formalised through the imposition of appropriate conditions on the resource consents being sought by WIAL. The proposed draft conditions are set out in Section 8.5. It is expected that these conditions will be subject to further amendments and refinements as the consenting process progresses.

In summary the proposed conditions set out obligations that deal with the following matters:

- General conditions;
- Management and mitigation of potential construction effects, requirements for community liaison and the preparation and implementation of an overarching Construction Management Plan;
- Management and mitigation of ecological effects during construction and requirements for post construction remediation;
- Management and mitigation of potential amenity and nuisance effects that are likely to arise during construction eg. construction traffic, noise, dust;
- Management and mitigation of potential effects on coastal processes including mitigation to offset the effects on surfing amenity within Lyall Bay;
- Management and mitigation of potential effects on natural character, and landscape values; and
- A requirement for urban design matters to be addressed including requirements for enhancements to (in particular) the coastal margin.

While a comprehensive assessment of the environmental effects has been undertaken which has included appropriate measures for mitigation across most of the relevant environmental values, there are a number of areas where it is more appropriate to impose conditions which set in place environmental process standards rather than requiring strict adherence to performance standards that may not, in the long term, be the best way to mitigate effects.

This is generally achieved by utilising management plans. Management plans vary in their function. At the most fundamental level management plans detail the steps that need to be taken to achieve a specified outcome. These management plans have application where there is reasonable certainty about the steps necessary to complete that function. The role of the management plan in this context is to provide detail as to how a particular parameter is to be met. The conditions of consent will establish the relevant parameters.

The second type of management plan is more sophisticated and better suited to those situations where a degree of flexibility is required in order to respond appropriately to monitoring results. This approach generally revolves around the use of management



plans to guide the way that a development or resource use occurs at the outset, which is coupled with comprehensive monitoring requirements and subsequent and ongoing adaptation of management responses to better achieve predicted or desired outcomes if necessary. This approach is referred to as “adaptive management”.

Both forms of management plans are appropriate to mitigate and manage the effects of the Project. An example of the first type of management plan includes the CMP which will establish the steps necessary to manage effects of construction including, management measures relating to noise, dust and traffic for example.

There are a number of elements of the Project which give rise to effects on environmental values and where the outcome cannot be predicted at the outset with absolute certainty due to the dynamic and complex nature of the ecosystems and coastal processes involved. Where such circumstances exist, an adaptive management approach can be a useful method in ensuring the desired results are attained. The following areas of management associated with this project can be the subject of such an approach:

- Effects on the aquatic ecology within the coastal environment affected by the reclamation; and
- Effects on coastal processes including surfing amenity and morphology.

### 8.3.1 Management Plans

This section sets out the framework of management plans required to avoid, remedy or mitigate effects. The following management plans will be prepared and implemented throughout the duration of the construction of the Project:

- Construction Management Plan (**CMP**).
- Stakeholder and Communications Management Plan (**SCMP**).
- Construction Air Quality Management Plan (**CAQMP**);
- Noise and Vibration Management Plan (**NVMP**);
- Construction Traffic Management Plan (**CTMP**);
- Erosion and Sediment Control Plan (**ESCP**);
- Environmental Mitigation and Management Plan (**EMMP**);
- Surf Mitigation Adaptive Management Plan (**SMAMP**);
- Landscape and Urban Design Management Plan (**LUDMP**); and
- Network Utility Management Plan (**NUMP**).

To provide an example of how these plans might be shaped, the draft framework for some of these plans has been developed and is submitted in draft form as part of this application. Those plans which are attached in draft form are identified below.

### 8.3.1.1 Construction Management Plan (CMP)

A draft framework for the CMP has been prepared for the Project (refer **Appendix D**). The CMP sets out in detail how effects during the construction of the Project are to be managed. It is intended that the CMP is an overarching document. Most other management plans relating to the management of construction related effects also fall under this main plan. This includes the following:

- SCMP;
- CAQMP;
- NVMP;
- CTMP; and
- ESCP.

The CMP provides the strategy for how the Project is going to be physically constructed. It sets out the method and tools that will be implemented by the Project managers, engineers and construction contractors to avoid, remedy or mitigate potential adverse environmental effects in order to meet the resource consent conditions, and other relevant legislative and construction related standards.

It is noted that the CMP will need to be populated, updated and finalised by the Project's contractors prior to construction once all the detailed design for the Project has been completed.

The CMP includes the principles and general approach to managing environmental effects, along with setting out a methodology and detail for delivering construction. The CMP covers all anticipated construction elements and presents a framework of principles, objectives, and performance standards that will be adhered throughout the construction period. It establishes the relationship with other environmental management plans that address specific topic areas for example construction noise, traffic and air quality.

Implementing the CMP will serve to appropriately avoid, remedy or mitigate any potential adverse environmental effects of the Project's construction. A range of proactive and reactive communication tools will also be employed that will require that the contractor clearly demonstrates that the community is engaged and informed throughout the construction period.

### 8.3.1.2 Specific Management Plans

In addition to the overarching CMP there are a number of additional specific plans that will be prepared and implemented as part of the construction and operation of the proposed runway extension.

As noted above, there are a number of construction related effects that will be managed via specific management plans. These more specific plans manage the effects of dust generated during construction, construction noise and construction traffic. The management methods for sediment discharges into the CMA and maintaining water quality will be set out in the ESCP.

Key mitigation features arising from the Project include ecological enhancement and coastal marine ecosystem monitoring, landscape and urban design treatments and construction and maintenance of the proposed submerged wave focussing structure. Conditions set out the requirements for the consent holder to implement these measures. Ongoing monitoring and maintenance obligations are also set within the proposed conditions and via the management plans referred to earlier and detailed below.

### **8.3.1.3 Community Liaison and Stakeholders and Communication Management Plan (SCMP)**

It is proposed that a Community Liaison Person will be appointed for the duration of the construction phase of the Project. This person will become well known to the community and be responsible for facilitating all of the communication between WIAL, contractors, and the community during the construction phase of the Project. This person will also be responsible for establishing and inviting appropriate members of the community to be part of a Community Liaison Group. The purpose of this group will be to provide a regular forum through which information about the Project can be obtained and further discussion can occur.

In addition, a SCMP will be prepared and implemented which will set out the procedures detailing how the public and stakeholders will be communicated with throughout the construction phase of the Project. The key members of the community in this regard have been identified as the Moa Point, Rongotai and surrounding communities, recreation and road users affected by construction activities. The purpose of this plan shall be to provide a framework for which WIAL will be required to inform the community of the construction progress, set out the requirement engagement and set out the action that will be taken should any complaints or queries be made during the construction activities.

### **8.3.1.4 Erosion and Sediment Control Plan (ESCP)**

As discussed in Chapter 7, Section 7.3, there is the potential for infilling of the reclamation and general construction activities to give rise to sediment discharges into the CMA. NIWA and AES have recommended a maximum turbidity limit of 25mg/L which is derived from an assessed level at which sea bird foraging could be adversely affected. It is noted however that this measure can at times be exceeded naturally, particularly in the inner parts of Lyall Bay (but unlikely in the outer bay). Therefore when ambient turbidity levels are naturally equal to, or greater than 15mg/L, a tolerance of up to 10mg/L plus ambient has been assessed as being acceptable.

Management of sediment discharges and attendant water quality throughout the construction phase will be implemented via an ESCP. A draft framework for this plan is attached as **Appendix E**. The ESCP will specify the erosion and sediment control measures that will be implemented during the construction phase of the Project, and confirm the monitoring obligations and actions that will be undertaken should any exceedance of the turbidity limits set out above occur.

### 8.3.1.5 Construction Air Quality Management Plan (CAQMP)

The CAQMP will set out the procedures and practices to be employed to monitor the discharge of particulates into the air during construction, methods to be used to control dust emissions from the construction works and any procedures for responding to complaints and events.

### 8.3.1.6 Construction Noise and Vibration Management Plan (CNVMP)

The purpose of the CNVMP is to manage construction noise and vibration. The CNVMP will set out the construction noise and vibration criteria for the Project and the associated measures for mitigating such effects. A draft framework for this plan is attached to **Technical Report 10**.

Where construction activities are anticipated to exceed the noise criteria specified in NZS6803:1999, schedules will be included in the CNVMP that identify the nature, timing and duration of the activity and the locations where conventional mitigation measures will not be sufficient to manage these effects. The procedures for consulting with affected residents (in particular the residents along Moa Point Road) and the alternative management and mitigation responses (such as temporary relocation) will also be set out in the schedule.

The plan will also detail the methodology for responding to noise effects in excess of the specified criteria. Monitoring requirements to confirm compliance with (as far as reasonably practicable) with the noise and vibration criteria will also be set out in the CNVMP and will apply for the duration of the Project.

### 8.3.1.7 Construction Traffic Management Plan (CTMP)

A CTMP will impose controls on all construction related traffic travelling to and from the proposed construction site, and within the site. The CTMP will require consultation with the relevant road controlling authorities over proposed road improvements required to facilitate construction traffic movements. A draft framework for this plan is attached to **Technical Report 9**.

The CTMP will confirm the procedures, requirements and standards necessary for managing the traffic effects during construction so that the transportation network continues to function in a safe and efficient manner including restrictions of traffic numbers, day time and night time haulage routes, and haulage windows.

### 8.3.1.8 Ecological Mitigation and Monitoring Plan (EMMP)

As set out in Chapter 7, ecological enhancement and habitat recreation is proposed to mitigate effects arising from the construction of the proposed runway extension on coastal aquatic ecosystems and existing reef habitats. The EMMP will be prepared in consultation with key stakeholders, such as DoC and Iwi. The objective of the EMMP shall be to set out practices to guide the recreation or enhancement of habitat along the rock dyke for species including marine algae and invertebrates, anemones, chitons, snails, lobsters, adult kina and paua. It will set out the design requirements for features that are to be incorporated into the rock dyke to provide for habitat recreation and enhancement. The EMMP will also set out what field collection of species (mobile macro-invertebrates) is required prior to construction commencing, storage

requirements and transferring obligations post construction. The EMMP will also set out the monitoring and reporting obligations throughout the construction period and post construction activities.

### 8.3.1.9 Surf Mitigation Adaptive Management Plan (SMAMP)

A submerged wave focussing structure is proposed in order to mitigate or offset the effects arising from the proposed runway extension on surfing amenity within Lyall Bay. The purpose of the SMAMP is to provide a description of the key performance design criteria for the structure including the details of the methodology and material that will be used to construct it. It will also set out the ongoing monitoring, reporting and maintenance requirements that will be required. A draft framework for this plan has been prepared and is attached as **Appendix F**. The SMAMP will require that the structure is designed so as to achieve the following objectives:

- Generate localised wave focussing across its footprint thereby forming pronounced wave peaks;
- After generation each wave peak propagates into shallower water to form peeling waves suitable for surfing;
- To ensure that the overall number and distribution of quality surf rides in Lyall Bay post completion of the proposed runway extension is either equal or better than existing conditions;
- That the structure will not cause an increase in safety risk to swimmers during mild wave and weather conditions;
- That the crest height of the structure is low enough to prevent waves breaking on the structure except during rare periods of exceptionally large wave heights;
- That the structure will not pose a safety risk to board riders, or other recreational users within Lyall Bay;
- That the structure will not cause adverse coastal erosion;
- That the structure is built in such a way that its structural integrity is not compromised by excessive seabed mobility or localised scour; and
- That the material selection and construction will not cause any adverse impacts on significant marine habitat or species.

The SMAMP will also require that monitoring is undertaken to ensure that additional baseline information is obtained to describe the pre-construction wave climate and sea bed morphology in Lyall Bay and to provide post construction verification that the structure meets the aforementioned design objectives. The preparation of the Plan will also be guided by feedback received from a Steering Committee (that will likely include representation from the Board Riders Club and other stakeholders and interested groups), who will be provided with access to any monitoring data and be given the opportunity to shape the form and function of the final plan.

#### 8.3.1.10 Landscape and Urban Design Management Plan (LUDMP)

As described in Chapters 4 and 7, a number of landscape and urban design features are to be incorporated into the final design of the Project. In order to guide this process a LUDMP is to be prepared and implemented. The purpose of the LUDMP is to detail the landscape/amenity improvement works planned along Moa Point Road, Moa Point beach and along the Lyall Bay promenade and roadway areas. A draft framework for this plan has been developed and is attached as **Appendix G**. Consultation with the WCC about these improvement works has commenced and it is expected that these discussions will continue during the consenting phase of the Project. The LUDMP will also set out the ongoing maintenance obligations and the entities responsible for this maintenance work.

### 8.4 SUMMARY OF MITIGATION, MONITORING AND OTHER MEASURES TO MANAGE EFFECTS

A range of mitigation, remediation, management and monitoring measures have been developed for the Project. These measures are summarised in the **Table 8-1** below.



Table 8-1: Summary of Mitigation /Management Recommended and Any Monitoring Proposed.

Actual or Potential Effect Identified	Mitigation/Management Recommended	Monitoring/Further Action Recommended	Condition Proposed
Coastal Processes			
The further extension of the runway into Lyall Bay may result in changes to the morphology of the surrounding Lyall Bay seabed morphology.	Post construction monitoring data, such as seabed bathymetry will be gathered to ensure any physical changes to the existing environment are appropriately documented and analysed.	Undertake a bathymetric survey in eastern Lyall Bay two years following construction of the rock dyke.	60
Potential for discharges (including contaminants) arising from sediment, dewatering and stormwater during construction into the CMA.	Discussed with respect to ecological effects below.	Discussed with respect to ecological effects below.	
Effects on the surfing amenity and swimming for a combination of wave heights and periods in some parts of Lyall Bay.  Airport Rights surf break will be lost as a result of the runway extension.	Prepare and implement a SMAMP that sets out the key performance objectives for the wave focusing structure and the monitoring and reporting requirements.	Undertake further modelling to confirm the overall shape, size and position of the submerged wave focussing structure to confirm the location and design of the structure will meet the objectives of the SMAMP.	66 -79
		Undertake additional baseline monitoring including:  - a detailed assessment of the waves at the Lyall Bay entrance, The Corner, and the anticipated location of the submerged wave focusing structure;  - seasonal surveys or nearshore bed morphology using LiDAR or similar on a quarterly basis to assess and quantify the seasonal variation in sediment movement.  - A surfing amenity survey.	70
	Design and construct an artificial wave focusing structure in Lyall Bay to mitigate effects on the surfing amenity in Lyall Bay.	Implementation of the SMAMP.	75
Ecological			
Potential for discharges arising from sediment, dewatering and stormwater discharges into the CMA during construction.	The preparation of an ESCP which will set out the measures to minimise discharge of turbid water and achieve best practice with respect to construction methodologies to prevent uncontrolled discharges of sediment or other contaminants into the CMA.		61
	The methods to minimise sediment discharges will need to be incorporated into the detailed design and construction methodology for the reclamation activity.	Preparation and implementation of an ESCP.	61
	Establishment of appropriate threshold limits for monitoring of turbidity:  - When the sensor-calibrated suspended sediment concentrations at the control site/s, using a 48-hour rolling median, are less than 15 mg/L then the maximum suspended sediment concentration allowable at the compliance site/s shall be 25 mg/L;  - When sensor-calibrated suspended sediment concentrations at the control site/s are equal or above 15 mg/L using a 48-hour rolling median, then the	Continuous turbidity monitoring at a compliance monitoring site located at the outer edge of the near-field zone of reasonable mixing, which shall be 150 m from each discharge point within the rock-dyke containing the reclamation, and a control site (or sites) located within Lyall Bay <sup>45</sup> .	63 - 65

<sup>45</sup> North of a line between the narrow isthmus of Hue te Taka Peninsula and Waitaha Cove.

	suspended sediment concentrations at the compliance site/s shall not exceed the ambient concentrations by more than maximum of an additional 10 mg/L (ambient plus 10 mg/L) based on a 48-hour rolling median.		
	As far as is practicable the use of clean fill low in silts, preferably marine based sands.	Monitoring of the sediment plume during construction of the reclamation and rock wall to confirm that limits are achieved and extent of plume is as predicted.	61
Loss of habitat associated with the reclamation and rock wall construction.	The addition of roughened/pitted surfaces on 50% of each accropode to increase the range of microhabitats available for colonising marine algae and invertebrates.	Preparation of an EMMP which will require the habitat enhancement measures to be incorporated into the design and construction of the runway extension.	80 - 85
	The inclusion of five shallow indented prisms along the arm of each accropode to increase the possibility of at least one forming a rock pool no matter what the final orientation of each accropode. The indented prisms on the underside of accropodes would provide suitable cavities for wind and sun intolerant groups such as anemones, while indented prisms on the sides of each arm would form suitable crevices for chitons and snails.		83
	The insertion of one 1m <sup>3</sup> concrete block with a truncated conical shaped hole in the top layer of the secondary armour every 10m around the perimeter of the rock dyke somewhere between mean low spring and mean high spring tide levels. This will add about 85 large rock pools to the intertidal zone with large concomitant increases in biodiversity in this zone.		
	To accommodate newly settled lobsters, accropodes are to incorporate holes of three sizes; small, medium and large. Each 1m <sup>2</sup> of accropode surface would have a minimum of one hole of each size (ie. three holes in total).		
	The rock dyke provides for a range of crevices, overhangs, flat open surfaces and dark shaded surfaces suitable for a wide range of reef fish and invertebrates, including juvenile and adult kina and paua.		
	The 0.5m filter bed where the rock dyke meets the seabed is to be sufficiently stable (and of suitable material – ie. stable hard substrate) for the attachment and growth of macroalgae in order to reduce sediment scour around the rock dyke.		
	The proposed construction may provide nesting sites for penguins without the need for artificial nest boxes, especially on the more sheltered eastern side of the runway extension.		
	Field collection of selected mobile macro-invertebrates (eg. paua, kina, large gastropods, starfish, etc.) from reefs destined for burial, holding these for the construction period in sea water facilities on land, and their later transfer to new reef surfaces once the construction is completed, in order to mitigate the effects of the destruction of rocky reefs and their resident	Surveys of the reef and benthic communities three years post construction and comparative analysis with surrounding reefs to indicate success of the recolonisation process.	84

	populations within the construction zone and speed up the repopulation of the rock dyke.		
Disruption or displacement of birds and marine mammals during construction.	Shading of lights during construction to minimise risk of bird attraction and strikes.		81
	Stopping construction activities if marine mammals (dolphins, whales) are observed within 100m of the work, as per best practice guidelines.	Monitoring of marine mammals during construction.	
Cultural			
Potential effects on cultural sites of significance.	Assistance provided by iwi groups has confirmed that there are no known sites of Iwi significance that will be directly affected by the proposed reclamation or associated earthworks on the landward side of the Airport. It is however noted that the area has in past seen finds of taonga (carved stone and bone items) along with Moa Bones. It is considered that such finds would be rare today, however it is appropriate that an accidental discovery protocol is in place throughout the construction of the proposed runway extension.	A MOU is to be developed between Iwi and WIAL which clearly recognises Iwi's kaitiaki role in relation to the Project area, and provides the basis for Iwi to work in partnership with WIAL through the course of the Project.	
Effects on the CMA including during construction through sediment discharges and the loss of habitat arising from the construction of the rock dyke and reclamation.	Iwi engagement in the preparation of the EMMP. Creation of habitat to enhance or offset the loss of species.	Preparation and implementation of the EMMP. Ongoing consultation with iwi throughout the construction of the Project, and annually for a period of five years post construction.	81
Impacts on customary and commercial fisheries.	Fishing exclusion area to prevent any potential conflicts between construction and other activities.  Iwi engagement in the preparation of the EMMP. Creation of habitat to enhance or offset the loss of species (as discussed above).		81 and 89
Construction Traffic			
Potential for congestion and safety issues along haulage routes during peak hour traffic.	A requirement that heavy haulage operations not occur during the peak hour traffic periods in order to minimise any adverse traffic related impacts during these time periods to other road users.	Prepare and implement a CTMP.	30 - 32
	Limiting the number of heavy vehicle movements on an hourly basis along the haulage route to ensure sufficient road network capacity particularly around identified intersections along the day time haulage route.		
Potential safety issues arising from the capacity of the current roading network to accommodate heavy construction vehicles.	Implement temporary traffic management plans at intersections and access ways along the proposed haulage route and implement reduced speed limits where appropriate and necessary to maintain the safety of the roading network.		
Potential noise and vibration effects for sensitive receivers located along haulage routes, including sleep disturbance.	Limiting the number of heavy vehicle movements on an hourly basis to ensure a no more than 3bB exceedance along the haulage route above ambient noise levels throughout the night time haulage period (10pm – 6am).		35

Potential damage to the roading network resulting from an increase in heavy vehicle movements.	Undertake pre and post construction pavement surveys and where appropriate (and agreed with the relevant road controlling authority), repair any damage of the carriageway and footpaths where such damage is found to have resulted from the construction project.	Undertake pre and post construction surveys comprising of photographic or videos record on the carriageway and provide a copy to the relevant road controlling authority.	32 -34
<b>Construction Noise</b>			
Potential weekday and weekend construction noise effects during day time hours.	All construction works will comply, as far as reasonably practicable with NZS6803:1999 during day time periods.	Undertake monitoring in representative locations surrounding the construction site.	45
	The preparation and implementation of a CNVMP for the duration of the project construction. The CNVMP will set out the management and operational practices to be implemented when managing noise effects.		42 - 44
	The establishment of a Construction Liaison Group. The terms of engagement of the Liaison Group will be set out the SCMP.		8 -10
	Establishment of a comprehensive complaints procedure that records all complaints and how they were resolved.		11
The potential for night time construction noise to generate annoyance and sleep disturbance	All construction works will comply, as far as reasonably practicable with NZS6803:1999.	Undertake monitoring in representative locations surrounding the construction site to ensure that the project's construction noise limits are being met.	45
	Only work during the evening when necessary.		46
	The preparation and implementation of a CNVMP for the duration of the project. The CNVMP will set out the management and operational practices to be implemented when managing noise effects.		42 - 44
	Preparation of a noise schedule that describes the site specific noise management and mitigation measures where the standards of NZS6803:1999 cannot be complied with. The schedule will describe the location, timing and duration of the noise generating activity, and the management or mitigation response required for residential dwellings affected by the elevated noise levels.		46
	Establishment of a Construction Liaison Group to discuss the environmental issues by the construction process (including noise and vibration). The terms of engagement of the Liaison Group will be set out the SCMP.	Implement the SCMP.	9
	Implement structural construction noise and vibration mitigation measures as necessary throughout the duration of the project (for example, barriers).		42 - 44
	Establishment of a comprehensive complaints procedure that records all complaints and how they were resolved.		11
Potential noise and vibration effects for sensitive receivers located along haulage routes, including sleep disturbance.	Limiting the number of heavy vehicle movements on an hourly basis to ensure a no more than 3bB exceedance along the		35

	haulage route above ambient noise levels throughout the night time haulage period (10pm – 6am).		
<b>Dust/Air Quality</b>			
Potential for unmitigated dust discharges from the construction of the runway extension to adversely affect the amenity of surrounding neighbours and create safety hazard for aircraft.	Monitoring and compliance with trigger level TSP.	Undertake pre-construction background air quality monitoring, including TSP, for three months.  Monitoring of continuous TSP for the duration of the project in accordance with Ground Practice Guide for Air Quality Monitoring and Data Management. A monitoring site shall be established between the beachfront area and the long term car park.	41
	Establish a weather station to ensure continuous meteorological data is available for the duration of the project.		37
	Review the daily scheduling of tasks based on the approaching weather conditions.	Daily review and monitoring of weather forecasts and meteorological observations for the purpose of scheduling work and associated dust management responses.	40
	Prepare and implement a Construction Air Quality Management Plan, including procedures for managing dust generating activities and associated responses.	Daily inspections of land immediately adjacent to the construction site, construction exits and adjoining roads for the presence of dust deposition.	36 -38
		Daily inspections of exposed construction surfaces for dampness to ensure exposed un-stabilised area are minimised.	40
	Establishment of a Construction Liaison Group to discuss the environmental issues by the construction process (including noise and vibration). The terms of engagement of the Liaison Group will be set out the SCMP.	Implement the SCMP.	9
	Establishment of a comprehensive complaints procedure that records all complaints and how they were resolved.		11
	Appropriate management of stockpiled material (size and height of piles, water and chemical stabilisers, installation of wind breaks around large piles, location of stockpiles away from sensitive receptors).	Implement the CAQMP. Daily visual inspections of stockpiles to ensure they are not being subjected to wind erosion;	36 -38
	Use of water carts to control dust.	Weekly inspections of water systems to ensure equipment is maintained and functioning effectively.	36 - 40
Potential for construction vehicles to generate nuisance dust emissions for surrounding neighbours and on the surrounding roading network.	Restrict the speed of construction vehicles using unsealed roads to 20km/hr.	Daily inspections of land immediately adjacent to the construction site, construction exits and adjoining roads for the presence of dust deposition.	
	Develop guidelines for the management of traffic and fill material that are within close proximity to sensitive receptors.		
	Require wheel washes to prevent the transportation of material onto sealed surfaces where the material can become a source of dust emissions.		
	Undertake sweeping of sealed surfaces within the construction area.		
	Use of water carts to control dust.		

Potential for construction vehicle emissions to affect the amenity of surrounding neighbours.	Ensure that appropriate maintenance regimes are in place for all construction vehicles, including engine maintenance, tyre pressure checks and vehicle loading.	Set out the vehicle management requirements of all construction vehicles in the CAQMP.	
	Ensuring that the haul roads are appropriately maintained.	Implementation of the CTMP.	30
Network Utilities			
The demand for network services during construction may potentially exceed the capacity of the networks.	Prepare and implement, in consultation with the relevant infrastructure provider, a NUMP.	Consult with network infrastructure providers during the detailed engineering and design phase of the project to determine whether utilities require protection in their current location, or diversion.	50 -53
Potential damage of network utilities during the construction for the runway project.	Prepare and implement, in consultation with the relevant infrastructure provider, a NUMP.	Consult with network infrastructure providers during the detailed engineering and design phase of the project to determine whether utilities require protection in their current location, or diversion.	
The runway extension works will extend over the existing Moa Point Treatment Plant Outfall Pipe structure, resulting in significant loadings on the existing structure.	Initial evaluations have identified a number potential techniques available for maintaining the integrity of the outfall structure.	Confirm the final detailed engineering design with Wellington City Council, Wellington Water and VEOLIA prior to the commencement of works.	
Archaeological			
Although early references to archaeological sites (including moa bones and middens) have been documented, there are no visible remnants or signs of these features still existing today. As noted above, it is likely that they were buried or destroyed when the runway extension occurred in 1959, or possibly via later development or natural coastal processes.	Contractor training and implementation of an accidental discovery protocol.		87 - 89
Recreational			
Potential annoyance or disruption of recreational pursuits (walking, cycling etc) during construction due to noise effects.	Compliance with relevant construction noise standards where practicable during day time and weekend construction activities.		45
Potential congestion/conflicts with recreational users (cyclists) along proposed public haulage routes.	Implementation of the CTMP discussed above.		30
	Liaison and clear notification of anticipated traffic movements to the surrounding community.	Implementation of a SCMP.	9
	Avoidance of heavy haulage movements during peak traffic hours, and limitations on the number of movements per hour during the haulage windows proposed.		35
	Maintaining pedestrian and cycle access along public roads as far as is practicable throughout the construction period.		30
Changes to the current surfing amenity in Lyall Bay.	Refer to the proposed wave focusing structure discussed above.		66 - 79
Temporary disruption during construction and loss of access to kai moana, fishing spots and recreational activities within the immediately affected CMA.	Temporary exclusion zone to avoid conflicts between construction and other activities.		21
	Proposed habitat enhancement features to encourage the recolonisation of species and coastal marine life.		80 - 85
	Public access to the Moa Point beach and coastal margin is proposed to be enhanced where appropriate.		86



Urban Design			
From an amenity perspective the effects of the proposed runway extension will be most significant on the adjacent residential enclave of Moa Point Road. During construction, noise and other construction activities will likely reduce the current amenity that is experienced at these properties. In the longer term the visual amenity experienced at these properties will be altered with a view of the extended runway.	Effects generated from the construction of the runway extension mitigated by temporary relocation of residents, or through acoustic insulation, subject to property owner agreement. Property purchase is also a possibility if this can be agreed between owners and WIAL.	Implementation of a SCMP.  Complaints procedure.	9 and 11
Disruption arising as result of the construction of the Project on traffic and pedestrian access in and around the area.	Refer to the Construction Traffic above.		30
The zoned open spaces of the coastal edge are affected by the proposed runway extension to the extent that the development will impact on the beach to the east and the land currently zoned open space off the end of the current runway.	Incorporation of a new shared path on the ‘urban edge’ side of the runway along the straight section of Moa Point Road which extends the promenade of Lyall Bay Parade with associated seating platforms.	Preparation and implementation of a LUDMP.	86
	New beach re-creation at the junction of the extension (existing and new extension) in the bay to the east which includes ecological habitat enhancements and a potential path to a view point along the runway extension edge out in the bay.		
	A new gateway landscape at the intersection of the airport road and Moa Point Road which can include reference to Maori cultural values in design process.		
	Enhanced lighting to improve the comfort for cycling and walking through the underpass.		
Landscape and Visual Amenity			
Temporary visual effects of construction activities. The residential area along Moa Point Road adjacent to the proposed runway extension are the most affected by construction activities.	Construction activities are to occur within a defined area within the Airport boundary and the temporary occupation area of the CMA.		
	Visual effects generated during the construction of the runway extension could be mitigated by temporary relocation of the most affected residents (Moa Point Road). Property purchase is also a possibility if this can be agreed between property owners (Moa Point Road) and WIAL.	Implementation of a SCMP.  Complaints procedure.	9 and 11
Long term visual effects arising from the proposed runway extension. These are most significant for those properties situated along Moa Point Road. As the distance from the extension increases, there is a corollary decrease in visual and landscape effects.	Existing rock debris and incursions of the rock wall around the current runway will be remediated, and the rock armouring around the entire edge of the extension will result in the whole of the extension having a uniform appearance.	Preparation and implementation of a LUDMP.	86
	The junction between the exterior rock armouring of the runway extension and the Moa Point shoreline beach area will be designed to provide a more functional and integrated edge to the adjoining beach.		
	Enhanced public access opportunities to Moa Point beach.		
		Property purchase is also a possibility if this can be agreed between property owners (Moa Point Road) and WIAL.	

Natural Character			
The two Lyall Bay “Component Areas” that will experience a reduction in natural character will be the Moa Point Embayment Area which will change from moderate to low and the Airport Area which will change from low to very low, both of which will be as a result of a reduction in marine and experiential attributes.	Modifying the existing man-made armoured western edge of the runway, including the proposed extension, and creating a ‘softer’ more natural edge on part of the eastern side of the runway extension along with the creation of and improvements to marine and terrestrial ecological habitats. Other mitigation measures include optimising public access opportunities along Moa Point Road and in the inner part of Lyall Bay.	Preparation and implementation of a LUDMP.	86
Temporary adverse effects on natural character will occur during the reclamation and runway construction process, including increased water turbidity affecting water quality, loss of paua and kina populations, habitat displacement, and disruption to some recreation activities, public exclusion zones and effects on experiential attributes.		Preparation and implementation of an EMMP.	80 - 83
Operational Noise			
Potential for increases in average noise levels from the Airport.	Compliance with the current District Plan limit. Aircraft noise will continue to be monitored post construction of the runway extension.	Ongoing monitoring of aircraft noise against District Plan limits.	N/A
Aircraft Operations			
Construction activities penetrating the obstacle limitation surface (OLS) resulting in adverse health and safety effects for aircraft and their passengers, as well as construction staff.	Place restrictions on the operational hours of construction activities that penetrate the OLS (ie. conduct such activities outside of airport operational hours).	Implement a MOWP. This will be prepared and implemented between WIAL and the airlines.	N/A
	Temporarily displace the runway 34 threshold to increase the approach of the OLS.		
Displacement of the runway threshold	Provide for the day time use of the runway only (to avoid the need for lighting configuration changes).		
	Implement a minimum 1100ft/5km visibility restriction for aircraft (to avoid operating restrictions on operators that do not have RNAV(GNSS) with barometric vertical guidance capability).		
	Provide a non-precision approach with vertical guidance (RNP or RNAV (GNSS) with barometric height guidance.		
	Provide temporary touchdown markings or zone limit markers.		
	Establish a different runway designator, such as runway 35, is used for the displaced threshold.		
Dust, glare and foreign objects and debris arising from construction activities may adversely impact of the safety of approaching and departing aircraft and their passengers.	Prepare and implement a MOWP. This will be prepared and implemented between WIAL and the airlines.		
	Undertake regular FOD checks, including prior to the first flight each morning.		
	Establish minimum buffers for construction equipment to avoid locating heavy machinery too close to the runway during operational hours.		

	Liaise with stakeholders, including airlines, during the promulgation of the MOWP.		
	Maintain a safety incident reporting system that records any safety incidents or observed hazards to aircraft operations;		

## 8.5 PROPOSED DRAFT CONDITIONS

Based on the mitigation, monitoring and other actions summarised in **Table 8-1**, a suite of proposed draft conditions has been developed. These are set out below.

**Table 8-2: Proposed Draft Conditions.**

Definitions	
<b>AEE</b>	Means the Wellington Airport Runway Extension Assessment of Effects on the Environment Volumes 1 to 2, dated April 2016
<b>CAQMP</b>	Construction Air Quality Management Plan
<b>City Council or WCC</b>	Means the Wellington City Council
<b>CMA</b>	Coastal Marine Area
<b>CMP</b>	Means the Construction Management Plan
<b>CNVMP</b>	Means the Construction Noise and Vibration Management Plan
<b>Commencement of Work</b>	Means the date when the work that is the subject of these consents commences
<b>Construction Phase</b>	Means the duration of the construction of the Project from site establishment through to completion of all construction related activities of the Project.
<b>Construction or Project Site</b>	Means the areas identified in Figure 1-5 of the AEE and includes all construction related activities landward of mean high water springs and out to the 300m temporary occupation area of the CMA.
<b>CTMP</b>	Means the Construction Traffic Management Plan
<b>District Plan</b>	Means the Wellington City Plan
<b>EMMP</b>	Ecological Mitigation and Monitoring Plan
<b>ESCP</b>	Erosion and Sediment Control Plan
<b>Heavy Vehicle</b>	Comprising of a truck and trailer unit approximately 23m long
<b>LUDMP</b>	Landscape and Urban Design Management Plan
<b>Manager GWRC</b>	Means the Manager, Environmental Regulation, Greater Wellington Regional Council
<b>Manager WCC</b>	Means the Manager, Environmental Regulation, Wellington City Council
<b>MHWS</b>	Mean high water springs
<b>NUMP</b>	Means the Network Utilities Management Plan
<b>Project</b>	Means the construction, maintenance and operation of the Wellington Airport Runway Extension, as described in Chapter 1 of the AEE.
<b>Project Website</b>	<a href="http://www.connectwellington.co.nz">www.connectwellington.co.nz</a>
<b>Regional Council or GWRC</b>	Means the Greater Wellington Regional Council
<b>RMA or 'the Act'</b>	Means the Resource Management Act 1991

<b>SCMP</b>	Stakeholder and Communications Management Plan
<b>SMAMP</b>	Surf Mitigation Adaptive Management Plan
<b>Stage</b>	Means a stage of the construction phase as nominated by the Consent Holder or contractor
<b>TSP</b>	Total Suspended Particulate
<b>TSS</b>	Total Suspended Sediment
<b>Work</b>	Means any activity or activities undertaken in relation to the Project
<b>Working Day</b>	Has the same meaning as in section 2 of the Resource Management Act 1991
<b>Condition Number</b>	<b>General Conditions</b>
1	<p>The Project shall be undertaken in general accordance with the plans and information submitted with the application and statutory forms as documented as consent numbers [INSERT REFERENCE NUMBERS HERE], subject to such amendments as may be required by the following conditions of consent.</p> <p>The plans and information include:</p> <ul style="list-style-type: none"> <li>a) Assessment of Environmental Effects report, dated April 2016</li> <li>b) Technical Reports contained in Volume 2 of the application</li> <li>c) Plans and information presented in support of the application at the hearing. Where there is conflict between the documents lodged and the conditions, the conditions shall prevail. Where there is an inconsistency between the information and plans lodged with the application and at the hearing, the most recent plans and information shall prevail.</li> <li>d) The relevant section of any technical report referred to in these conditions shall be regarded as part of these conditions, and a copy of each shall be appended to these conditions.</li> <li>e) The Project Website shall provide online access to these conditions and the plans and reports referred to in these conditions throughout the construction of the Project, and hard copies shall be available at the Project site office, and presented to any City or Regional Council officer on request.</li> </ul>
2	<ul style="list-style-type: none"> <li>a) The Consent Holder shall permit the agents and officers of the City and Regional Council to have supervised access to relevant parts of the construction site for the purpose of carrying out inspections, surveys, investigations, tests, measurements and/or to take samples to enable the City and Regional Councils to undertake their monitoring functions in relation to the Project.</li> </ul>
3	<p>Monitoring of wind speed, wind direction, air temperature and rainfall shall be undertaken:</p> <ul style="list-style-type: none"> <li>a) In general accordance with the Good Practice Guide for Air Quality Monitoring and Data Management, Ministry for Environment, 2009; and</li> <li>b) Continuously for the duration of the construction phase of the Project, at a location that is representative of the local weather conditions across the construction site.</li> </ul>

	<b>Pre-construction Administration</b>
4	<p>a) The Consent Holder shall arrange a pre-construction site meeting between the City and Regional Council and any other relevant party nominated by the City and Regional Council (Invited Parties), including the primary contractor, at least 10 working days prior to commencement of Work.</p> <p>b) In the case that any of the Invited Parties, other than the representative of the Consent Holder/Requiring Authority, does not attend this meeting, the Consent Holder will have been deemed to have complied with this condition, provided the invitation requirement is met.</p> <p>c) The Consent Holder shall ensure that additional site meetings are held between the Consent Holder/Requiring Authority, and Invited Parties, at appropriate intervals, and not less than every six months following commencement of Work.</p>
	<b>Consent Lapse and Expiry</b>
5	Pursuant to section 125(1) of the Act, this consent [INSERT WCC/GWRC REFERENCE NUMBERS] shall lapse 15 years from the date of its commencement unless it has been given effect, surrendered or been cancelled at an earlier date.
6	<p>Pursuant to section 123(c) of the Act, the following consents:</p> <p><b>CONSTRUCTION RELATED GRWC CONSENTS</b></p> <p>shall expire 10 years from the date of its commencement.</p> <p>Pursuant to section 123(c) of the Act, the following consents:</p> <p><b>OPERATIONAL CONSENTS</b></p> <p>shall expire 35 years from the date of its commencement</p>
	<b>Review of Consents</b>
7	<p>The Manager GWRC and the Manager WCC may review any or all conditions of this consent by giving notice of their intention to do so pursuant to section 128 of the Act, at any time within six months of the anniversaries of the Commencement of Work date for any of the following purposes:</p> <p>a) To deal with any adverse effects on the environment, which may arise from the exercise of this consent, and which it is appropriate to deal with at a later date;</p> <p>b) To review the adequacy of any monitoring plans proposed and/or monitoring requirements so as to incorporate into the consent any monitoring or other requirements which may become necessary to deal with any adverse effects on the environment arising from the exercise of this consent; and</p> <p>c) Ensuring the conditions of this consent are consistent with any National Environmental Standards Regulations, relevant plans and/or the Wellington Regional Policy Statement.</p>
	<b>Community Liaison</b>
8	A Community Liaison person shall be appointed by the Consent Holder for the duration of the construction phase of the Project. The Consent Holder shall take appropriate steps to seek to advise all affected parties of the Community Liaison person's name and contact details. If the Community Liaison person will not be



	available for any reason, an alternative contact person shall be nominated, to ensure that a Project contact person is reasonably available at all times during the construction phase of the Project.
9	<p>a) Prior to the commencement of construction, the Consent Holder shall prepare and implement a Stakeholder and Communications Management Plan (SCMP) that sets out procedures detailing how the public and stakeholders will be communicated with throughout the construction phase of the Project. The stakeholders comprise the Moa Point and Rongotai communities, road users and the residents affected by construction activities.</p> <p>b) The purpose of the SCMP is to provide a framework to:</p> <ul style="list-style-type: none"> <li>(i) Inform the community of construction progress;</li> <li>(ii) Engage with the community in order to foster good relationships and to provide opportunities for learning about the Project;</li> <li>(iii) Provide early information on key Project milestones; and</li> <li>(iv) Respond to queries and complaints.</li> </ul> <p>c) As a minimum, the SCMP shall include:</p> <ul style="list-style-type: none"> <li>(i) Details of a contact person available on-site at all times during Work. Contact details shall be prominently displayed at the entrance to the site(s) so that they are clearly visible to the public at all times.</li> <li>(ii) Methods to consult on and to communicate the proposed hours of construction activities outside of normal working hours and on weekends and public holidays, to surrounding residential communities, and methods to deal with concerns raised about such hours.</li> <li>(iii) Any stakeholder specific communication plans required.</li> <li>(iv) Monitoring and review procedures for the SCMP.</li> <li>(v) Details of communications activities proposed including: <ul style="list-style-type: none"> <li>• Publication of a newsletter, or similar, and its proposed delivery area.</li> <li>• Newspaper advertising.</li> <li>• Notification and consultation with individual property owners and occupiers with dwellings along Moa Point Road, and along the proposed haulage routes.</li> <li>• The use of the Project website for public information.</li> </ul> </li> </ul> <p>The SCMP shall include linkages and cross-references to methods set out in other management plans where relevant. The SCMP shall be provided at least 15 working days prior to construction commencing, to the Manager GWRC, Manager WCC and the Community Liaison Group.</p>
10	<p>The Consent Holder shall establish a Community Liaison Group.</p> <p>a) Membership of the Community Liaison Group shall include (but not be limited to):</p> <ul style="list-style-type: none"> <li>(i) The Community Liaison person;</li> <li>(ii) Representatives of Wellington International Airport Ltd;</li> <li>(iii) A representative of the Contractor appointed to undertake the works;</li> <li>(iv) Representatives of the local community including at least one resident of Moa Point Road;</li> <li>(v) A representative of Iwi manawhenua;</li> <li>(vi) A representative council officer from WCC and GWRC.</li> </ul>

	<p>b) The purpose of this group shall be to provide a means for monitoring the effects of constructing the Project on the community by providing a regular forum through which information about the Project can be provided to the community.</p> <p>c) Matters to be discussed by the Community Liaison Group shall include:</p> <ul style="list-style-type: none"> <li>(i) The traffic, noise and dust minimisation, lighting, landscaping, and other related aspects.</li> <li>(ii) Likely times and duration of night time construction work, likely traffic disruption and establish a reasonable means of communication with affected persons.</li> <li>(iii) Discuss suitable content and form for dissemination of information to the public. The Consent Holder may also separately disseminate information to the public.</li> <li>(iv) Assist the Consent Holder in monitoring the effects during the construction period and monitoring the contractor's compliance with the conditions of consent relating to the construction work.</li> </ul> <p>d) The Consent Holder shall ensure that invitations to attend meetings are issued to the Community Liaison Group at least once every three months throughout the construction period so that the intentions of this condition are fulfilled.</p> <p><i>Advice Note:</i>  <i>The Consent Holder shall consider any feedback or recommendations provided to it by the Community Liaison Group in a meaningful and transparent way. For the avoidance of doubt the Community Liaison Group does not have any delegated authority as a decision maker.</i></p>
	<p><b>Complaints</b></p>
11	<p>a) At all times during the construction phase of the Project, the Consent Holder shall maintain a permanent register of any complaints received alleging adverse effects from, or related to, the exercise of these consents. The record shall include:</p> <ul style="list-style-type: none"> <li>(i) the name and address (where this has been provided) of the complainant;</li> <li>(ii) identification of the nature of the complaint;</li> <li>(iii) location, date and time of the complaint and of the alleged event;</li> <li>(iv) weather conditions at the time of the complaint (as far as practicable), including wind direction and approximate wind speed if the complaint relates to air discharges;</li> <li>(v) the outcome of the Consent Holder's investigation into the complaint;</li> <li>(vi) measures taken to respond to the complaint; and</li> <li>(vii) any other activities in the area, unrelated to the Project that may have contributed to the complaint, such as unusually noisy or dusty conditions generally.</li> </ul> <p>b) The Consent Holder shall respond to any complaint within 10 working days of the complaint;</p> <p>c) The Consent Holder shall also maintain a record of its responses and any remedial actions undertaken;</p>

	d) This record shall be maintained on site and shall be made available to the Manager WCC and the Manager GWRC, upon request. The Consent Holder shall provide the Manager WCC and the Manager GWRC with a copy of any complaints register every two months.
12	The complaints process under condition 11 shall continue for six months following the commissioning of the Project. Any complaints received after this period shall be managed by the Consent Holder in accordance with its standard complaints procedures.
<b>Sequencing and Schedule of Construction Activities</b>	
13	<p>a) The Consent Holder shall submit to the Manager WCC and the Manager GWRC at least 30 working days prior to commencement of construction a detailed programme outlining the proposed sequencing and/or staging of the Construction phase activities.</p> <p>b) This programme is to assist the WCC and GWRC to provide resources to certify these management plans within the appropriate timeframes.</p> <p>c) In addition to condition 15 below, the Consent Holder shall provide each Council Manager with any updated programme of construction sequencing if significant changes occur in the programme. Any updated programme shall be submitted at least 5 days before any such changes in scheduling or sequencing occurs.</p>
14	The Consent Holder shall provide detailed engineering plans and drawings (including dimensioned, cross-sections, elevations and site plans) of all areas of proposed construction of the Project (including associated permanent and temporary CMA occupation), permanent structures and temporary structures to the Manager GWRC with at least 30 working days before the proposed date of commencement of the construction of the reclamation or any ancillary temporary structures.
15	The Consent Holder shall provide the Manager WCC, the Manager GWRC and the CLG with a schedule of construction activities for the Project at monthly intervals throughout the construction phase of the Project. Each monthly schedule shall demonstrate how it fits into the overall sequencing programme required by condition 13 and shall indicate appropriate intervals at which an invitation will be made to the Council Managers to meet on-site to discuss the next stage or stages of construction activities.
<b>Six Monthly Monitoring</b>	
16	<p>The Consent Holder shall provide a six monthly monitoring report to the Manager WCC, the Manager GWRC and the CLG on 1 June and 1 December each year (or on an alternative date as otherwise agreed to by the Council Manager(s) for the duration of the Construction Phase. The purpose of this report is to provide an overview of the monitoring and reporting work undertaken, and any environmental issues that have arisen during the construction phase of the Project. As a minimum, this report shall include:</p> <p>a) All monitoring data required in accordance with the conditions of this consent and a summarised interpretation of this data;</p> <p>b) Any reasons for non-compliance or difficulties in achieving compliance with the conditions of this resource consent;</p>

	<ul style="list-style-type: none"> <li>c) Any work that has been undertaken to improve the environmental performance on the site or that is proposed to be undertaken in the up-coming six months;</li> <li>d) Recommendations on alterations to the monitoring required and how and when these will be implemented through changes to the relevant management plans; and</li> <li>e) Any other issues considered important by the Consent Holder/Requiring Authority.</li> </ul>
	<b>Management Plans – General</b>
17	<ul style="list-style-type: none"> <li>a) All construction work shall be carried out in accordance with the applicable management plan(s) and other plans required by these conditions.</li> <li>b) The draft management plans lodged with the resource consent application and those required to be prepared in accordance with these consents shall be prepared and/or updated and finalised by the Consent Holder and provided in draft form to the Manager GWRC and the Manager WCC for initial comment at least 30 working days prior to the commencement of the Construction Phase or relevant Stage specified in accordance with condition 13.</li> <li>c) The following final management plans must be provided to the Council Manager(s) for certification at least 10 working days prior to the commencement of the Construction Phase or relevant Stage: <ul style="list-style-type: none"> <li>i) Construction Management Plan;</li> <li>ii) Construction Noise and Vibration Management Plan;</li> <li>iii) Construction Air Quality Management Plan;</li> <li>iv) Construction Traffic Management Plan;</li> <li>v) Erosion and Sediment Control Plan;</li> <li>vi) Ecological Mitigation and Monitoring Plan;</li> <li>vii) Surf Mitigation Adaptive Management Plan;</li> <li>viii) Landscape and Urban Design Management Plan; and</li> <li>ix) Network Utility Management Plan.</li> </ul> </li> <li>d) These management plans shall be prepared in general accordance with any relevant consent conditions. Prior to being submitted to the Manager WCC or the Manager GWRC for certification, the management plans listed in c)(i)-(iii) above shall be reviewed by a suitably qualified person. Any comments and inputs received from the reviewer shall be clearly documented, along with clear explanation of where any comments have not been incorporated and the reasons why. The Construction Phase shall not commence until the Consent Holder has received the Council Managers' written certification for the management plans.</li> <li>e) The management plans listed in c) above provide the overarching principles, methodologies and procedures for managing the effects of construction of the Project to achieve the environmental outcomes and performance standards required by these conditions.</li> <li>f) A copy of the certified management plans listed in c) above will be provided to the CLG and made publicly accessible on the Project website.</li> </ul> <p><i>Advice Note:</i></p>

	<i>The management plans are not required to include all details for every construction stage at the time the plan is submitted for certification. If further details are to be provided later, the construction staging plan (refer condition 13) and relevant management plan shall specify which stages require further certification at a later date. Further details shall be submitted to the Council Manager prior to construction commencing in the relevant stage.</i>
18	If the Consent Holder seeks to make a 'minor' change to a certified management plan, the change shall be submitted to the Council Manager for certification at least two working days prior to any changes taking effect. For the purpose of this condition, 'minor change' is defined in the relevant management plan. If the Consent Holder seeks to make a more than minor change to a management plan, the change shall be submitted to the Council Manager for certification at least five Working Days prior to that change taking effect.
19	Where a management plan is required to be prepared in consultation with any third party, the management plan shall demonstrate how the views of that party (or parties) have been incorporated, and where they have not, and the reasons why.
20	<p>a) In the event of any dispute, disagreement or inaction arising as to any certification required by the conditions, or as to the implementation of, or monitoring required by the conditions, matters shall be referred in the first instance to either the Manager GWRC, or the Manager WCC (as relevant) to determine a process for resolution of the dispute, disagreement or inaction.</p> <p>b) If a resolution cannot be agreed within 10 working days of lodging the particular management plan, the matter may be referred to an independent appropriately qualified expert, acceptable to both parties, setting out the details of the matter to be referred for determination and the reasons the parties do not agree.</p> <p>c) The qualified expert shall be appointed within five working days of the Consent Holder or the Council giving notice of their intention to seek expert determination. The expert shall issue a decision on the matter within five working days.</p> <p>d) The decision of the qualified expert is binding on the Consent Holder and shall be implemented.</p> <p>e) The dispute resolution process above will be applied before any formal enforcement action is taken by the Council, except in urgent situations.</p>
<b>Construction Management Plan</b>	
21	In accordance with condition 17, the Consent Holder shall prepare a Construction Management Plan (CMP). The purpose of the CMP shall be to confirm construction methodologies, plant equipment and construction timeframes, including staging, and identify the measures to avoid, remedy or mitigate adverse effects from construction activities. The CMP shall include, as appendices, the suite of management plans required under condition 17 which must be certified prior to the commencement of construction.
22	<p>The CMP shall include details of:</p> <p>a) The management of construction activities;</p> <p>b) Public access restrictions including areas and notification requirements;</p>

	<ul style="list-style-type: none"> <li>c) Marine equipment and operational requirements;</li> <li>d) Staff and contractors' responsibilities;</li> <li>e) Training requirements for employees, sub-contractors and visitors;</li> <li>f) Environmental incident and emergency management;</li> <li>g) Communication and interface procedures;</li> <li>h) Environmental complaints management (required under condition 11);</li> <li>i) Compliance monitoring;</li> <li>j) Environmental reporting; and</li> <li>k) CMP review.</li> </ul>
23	<p>The CMP shall confirm the material (eg. rock, fill, accropodes) requirements and sources of material that will be utilised in the construction of the Project. Details of the transportation of the material to the construction site and management of the material once it has reached the Project site (ie. storage/stockpiles) shall also be provided in the CMP. If any of the material is to be transported to the site via a barge, details of any mooring and vessel management systems that will be utilised shall also be provided.</p>
24	<p>The CMP shall provide details relating to the site preparation, establishment, laydown areas, plant equipment and post construction rehabilitation, including but not limited to:</p> <ul style="list-style-type: none"> <li>a) Location of site offices and other construction staff facilities (car parking, amenities);</li> <li>b) Location of storage and laydown areas;</li> <li>c) Location and extent of fill stockpiles;</li> <li>d) Plant equipment including both landside and marine based equipment, as well as mooring requirements;</li> <li>e) Machine and vehicle refuelling areas;</li> <li>f) Project lighting; and</li> <li>g) Details of the site demobilisation and rehabilitation of the site post construction of the Project.</li> </ul>
25	<p>The CMP shall include a lighting plan for the Project. The purpose of this plan shall be to ensure that lighting overspill and illumination to airside activities, adjoining land uses and marine species is appropriately managed. The Plan shall identify the methods to manage light spill on adjacent land uses as far as is practicable and to minimise the risk of bird attraction and strikes.</p>
26	<p>The Consent Holder shall ensure that personnel responsible for supervising contractor site staff (eg. foremen, supervisors, and managers) shall undergo environmental awareness training required by the CMP. Specifically, training may include (as relevant) but not be limited to:</p> <ul style="list-style-type: none"> <li>a) Design details for erosion and sediment control measures and associated methodologies;</li> <li>b) The sensitivity of the coastal marine area and how these aspects should be managed (ie. the presence of marine mammals, birds, etc.); and</li> <li>c) Briefing on the requirements for any cultural ceremonies to occur before or during the commencement of construction.</li> </ul>



27	The CMP shall confirm final details, staging and sequencing of construction, and sufficient engineering design information to ensure that the Project remains within the limits and standards approved under this consent and that the construction activities avoid, remedy or mitigate adverse effects on the environment in accordance with the conditions of this consent.
28	The CMP shall be implemented and maintained throughout the entire Construction Phase and following construction as necessary.
29	A copy of the CMP shall be held on the construction site at all times and be available for inspection by the WCC and GWRC, and be made publicly accessible on the Project website.
<b>Construction Traffic Management</b>	
30	<p>In accordance with condition 17, the Consent Holder shall submit a Construction Traffic Management Plan (CTMP). The objectives of the CTMP shall be to:</p> <ol style="list-style-type: none"> <li>1. Meet the specific requirements for construction traffic management including, where required, to obtain approval from road controlling authorities for the activities required. Where any approval is required from a private land holder, or a person having an interest in private land; to obtain those approvals before undertaking any work; to be in accordance with the relevant By-Laws, Acts, Regulations and Wellington City conditions pertaining to traffic;</li> <li>2. adopt NZTA's Code of Practice for Temporary Traffic Management including any activity that varies the normal operating conditions of any road;</li> <li>3. ensure the application of best practice methodology to all traffic controls associated with construction;</li> <li>4. ensure compliance with relevant legislative requirements;</li> <li>5. effectively manage traffic generated during the construction phases of the project so that: <ul style="list-style-type: none"> <li>- construction traffic volumes are safely accommodated within the existing road network;</li> <li>- so far as is reasonably practicable, congestion or traffic delays are avoided;</li> <li>- any traffic effects associated with construction are mitigated as far as reasonably practicable; and</li> <li>- the needs of other road users and liaison with road controlling authorities, residents, businesses, sports facilities, major events organisers and emergency services are considered and where appropriate addressed.</li> </ul> </li> </ol> <p>The certified CTMP shall confirm the procedures, requirements and standards necessary for managing the traffic effects during construction of the Project so that safe, adequate and convenient facilities for local movements by all transport modes are maintained throughout the construction period. In particular, the CTMP shall describe, where appropriate:</p> <ol style="list-style-type: none"> <li>a) Any temporary changes to the speed limit, including a 20km/hr speed limit on unsealed construction site haul roads;</li> </ol>

	<ul style="list-style-type: none"> <li>b) Provision for the safe and efficient access to construction vehicles to and from the construction site;</li> <li>c) Haulage vehicle routes including any limitations and any associated permit requirements;</li> <li>d) Temporary traffic management measures to manage intersection and road user safety, as well the methods to manage any temporary closures of any public roads;</li> <li>e) Pre and post construction pavement condition surveys;</li> <li>f) Changes required to the existing landside vehicle and pedestrian access to facilitate construction activity. Techniques employed to manage staff vehicle movements safely and efficiently to and from the construction site;</li> <li>g) Monitoring and reporting;</li> <li>h) Emergency response and incident management; and</li> <li>i) The identification of staff and contractors' responsibilities.</li> </ul>
31	The CTMP shall be implemented and maintained throughout the construction phase of the Project and following construction as necessary, and updated if required.
32	The Consent Holder shall use best endeavours to ensure that Moa Point Road remains fully operational for both vehicular and pedestrian use throughout the Construction Phase, and any necessary modification or upgrades are implemented prior to the completion of construction of the Project. The Plans specifying these modifications and/or upgrades shall be submitted as part of the CTMP. Where any temporary closures are required, the Consent Holder shall be required to notify the roading authority and the CLG and implement any measures specified in the CTMP for managing traffic and pedestrian access during any closures required.
33	<ul style="list-style-type: none"> <li>a) Prior to the construction of the Project, the Consent Holder shall undertake a pre-construction condition survey of the carriageway/s along those roads affected by the Project and submit a copy to the relevant road controlling authority. The condition survey shall consist of a photographic or video record of the carriageway, and shall include roughness, rutting defects and surface condition.</li> <li>b) As soon as practicable following completion of construction of the Project, the Consent Holder shall, at its expense, conduct a post-construction condition survey of the road network affected by the Project.</li> <li>c) The results of the pre and post construction surveys will be compared and, where necessary, the Consent Holder shall, at its expense, arrange for repair of any damage to the carriageways and footpaths (and associated road components), where that damage has resulted from the impacts of construction of the Project.</li> </ul>

34	<p>a) The Consent Holder shall carry out regular inspections of the road network affected by the Project during construction to ensure that all potholes and other damage resulting from the construction of the Project are identified as soon as practicable.</p> <p>b) The Consent Holder shall contribute fair and reasonable costs towards repair and maintenance of potholes and other damage resulting from the construction of the Project.</p> <p>c) Prior to construction commencing, the Consent Holder will agree with the relevant road controlling authority the nature, extent and frequency of the inspections.</p>																																													
35	<p>a) Heavy vehicle movements for the transportation of construction material to and from the Site shall be restricted to the following transportation periods:</p> <p>(i) Monday to Friday 9:30am to 2:30pm along the route shown in Figure 1-2; and,</p> <p>(ii) Monday to Friday 10pm – 6am along the route shown in Figure 1-3.</p> <p>b) The number of heavy vehicle movements along the routes shown in Figures 1-2 and 1-3 shall not exceed the following:</p> <table><tr><th>One hour period starting</th><th>Day Time Route (Figure 1-2)</th><th>Nigh Time Route (Figure 1-3)</th></tr><tr><td>9.30am</td><td>15</td><td></td></tr><tr><td>10am</td><td>30</td><td></td></tr><tr><td>11am</td><td>30</td><td></td></tr><tr><td>12 noon</td><td>30</td><td></td></tr><tr><td>1pm</td><td>30</td><td></td></tr><tr><td>2pm – 2.30pm</td><td>15</td><td></td></tr><tr><td>10pm</td><td></td><td>30</td></tr><tr><td>11pm</td><td></td><td>25</td></tr><tr><td>12am</td><td></td><td>25</td></tr><tr><td>1am</td><td></td><td>15</td></tr><tr><td>2am</td><td></td><td>5</td></tr><tr><td>3am</td><td></td><td>10</td></tr><tr><td>4am</td><td></td><td>20</td></tr><tr><td>5am</td><td></td><td>30</td></tr></table>	One hour period starting	Day Time Route (Figure 1-2)	Nigh Time Route (Figure 1-3)	9.30am	15		10am	30		11am	30		12 noon	30		1pm	30		2pm – 2.30pm	15		10pm		30	11pm		25	12am		25	1am		15	2am		5	3am		10	4am		20	5am		30
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Construction Dust Management																																														
36	In accordance with condition 17 the Consent Holder shall prepare a Construction Air Quality Management Plan (CAQMP). The purpose of the CAQMP shall be to establish procedures for monitoring the discharge of particulates into the air during construction, methods to be used to limit dust and any odour nuisance, and procedures for responding to any complaints and events in order to comply with the outcomes and standards required under Condition 11 above.																																													
37	The CAQMP shall, as a minimum, set out its objectives and intended outcome and address the following:																																													

	<ul style="list-style-type: none"> <li>a) The location of the Total Suspended Particulate (TSP) monitoring site between the beachfront area and the long term car park and the specific methods for monitoring, including trigger limits to determine when further action is required;</li> <li>b) Visual monitoring of dust emissions;</li> <li>c) Methods to be used to limit dust nuisance, including: <ul style="list-style-type: none"> <li>(i) Guidelines for the operation of construction vehicles, including speed restrictions of 20km/hr for vehicles on unsealed construction haul roads;</li> <li>(ii) Guidelines for the placement of fill material;</li> <li>(iii) Guidelines for the management of dust tracking on adjacent roads;</li> <li>(iv) Guidelines for the establishment and/or use of stockpiles, including dust control; and</li> <li>(v) Guidelines for the control of dust on operational areas of the site.</li> </ul> </li> <li>d) Criteria for implementation of dust control on the site, including wind speed triggers;</li> <li>e) Continuous monitoring of TSP concentrations and meteorology;</li> <li>f) Monitoring of construction vehicle maintenance;</li> <li>g) Process equipment inspection, maintenance, monitoring and recording;</li> <li>h) The identification of staff and contractors' responsibilities.</li> </ul>
38	The CAQMP shall be implemented and maintained throughout the construction phase of the Project and following construction as necessary, and updated if required.
39	The Total Suspended Particulate monitoring required by Condition 37 will be installed a minimum of three months prior to construction commencing and the results provided to the Councils. This data shall be used to provide a background TSP concentration.
40	<p>The visual dust monitoring required in accordance with the CAQMP shall comprise:</p> <ul style="list-style-type: none"> <li>a) A daily review of: <ul style="list-style-type: none"> <li>(i) weather forecasts; and,</li> <li>(i) weather conditions observed and data outputs from weather stations;</li> </ul> for the purpose of planning an appropriate daily work schedule and associated dust management responses;</li> <li>b) A daily inspection of: <ul style="list-style-type: none"> <li>(i) stockpiles to ensure they are not being subjected to wind erosion;</li> <li>(ii) land immediately adjacent to the construction site, construction exits and the adjoining roads for the presence of dust deposition;</li> <li>(iii) exposed construction surfaces for dampness to ensure exposed un-stabilised areas are minimised; and</li> <li>(iv) dust generating activities to ensure dust emissions are effectively controlled.</li> </ul> </li> <li>c) Weekly inspections of: <ul style="list-style-type: none"> <li>(i) Watering systems to ensure equipment is maintained and functioning effectively to dampen exposed areas.</li> </ul> </li> </ul>

41	<p>In accordance with the CAQMP:</p> <p>a) if during the Construction Phase TSP levels reach Trigger Level 1, being the ambient concentration (as measured during the preconstruction monitoring) plus 120 micrograms per cubic metre (as a one hour average) then the contractor shall immediately undertake a visual inspection of the Construction Site to assess whether dust mitigation measures are required to avoid dust nuisance occurring.</p> <p>b) if during the Construction Phase TSP levels reach Trigger Level 2, being the ambient concentration (as measured during the preconstruction monitoring) plus 150 micrograms per cubic metre (as a one hour average) then all activities with the potential to generate dust on the Construction Site (apart from dust mitigation) shall cease until such time as TSP levels drop below Trigger Level 1.</p> <p>c) if an investigation identifies that Construction Site activities are not the cause of the high dust concentrations, construction activities may resume prior to concentrations dropping to below Trigger Level 1.</p>											
<b>Construction Noise and Vibration Management</b>												
42	<p>In accordance with condition 17, the Consent Holder shall prepare a Construction Noise Vibration Management Plan (CNVMP). The purpose of the CNVMP shall be to provide a framework to manage construction noise/vibration appropriately by outlining the methods, procedures and standards for mitigating the effects of noise and vibration during construction of the Project.</p>											
43	<p>The CNVMP shall, as a minimum, set out its objectives and intended outcome and address the following:</p> <p>a) Description of the work, anticipated equipment/processes and their scheduled durations;</p> <p>b) Hours of operation, including times and days when construction activities causing noise and/or vibration would occur including a noise schedule;</p> <p>c) The construction noise and vibration criteria for the Project;</p> <p>d) Identification of affected houses and other sensitive locations where noise and vibration criteria apply and where exceedances of the standards may occur;</p> <p>e) Construction noise control measures;</p> <p>f) Monitoring and reporting;</p> <p>g) Emergency response and incident management; and</p> <p>h) The identification of staff and contractors' responsibilities.</p>											
44	<p>The CNVMP shall be implemented and maintained throughout the construction phase of the Project and following construction as necessary, and updated if required.</p>											
45	<p>a) Construction noise shall comply, as far as reasonably practicable, with the following criteria in accordance with NZS6803:1999:</p> <p>Residential receivers</p> <table><tr><th>Time of week</th><th>Time period</th><th>dB LAeq(T)</th><th>dB LAmax</th></tr><tr><td rowspan="2">Weekdays</td><td>0630-0730</td><td>55</td><td>75</td></tr><tr><td>0730-1800</td><td>70</td><td>85</td></tr></table>	Time of week	Time period	dB LAeq(T)	dB LAmax	Weekdays	0630-0730	55	75	0730-1800	70	85
Time of week	Time period	dB LAeq(T)	dB LAmax									
Weekdays	0630-0730	55	75									
	0730-1800	70	85									

		1800-2000	65	80
		2000-0630	45	75
	<b>Saturdays</b>	0630-0730	45	75
		0730-1800	70	85
		1800-2000	45	75
		2000-0630	45	75
	<b>Sundays and public holidays</b>	0630-0730	45	75
		0730-1800	55	85
		1800-2000	45	75
		2000-0630	45	75
	<b>Industrial and commercial receivers</b>			
	Time period	dB LAeq(T)		
	0730-1800	70		
	1800-0730	75		
	(T) means a duration between 15 minutes and 60 minutes, in accordance with NZS6803:1999.			
	b) Construction noise is assessed and managed in accordance with NZS6803:1999 Acoustics – Construction Noise;			
	c) Where the criteria set out above cannot be practicably met, the process of Condition 46 shall be followed.			
46	a) Where the criteria of Condition 45 cannot practicably be met, the Consent Holder shall prepare a separate Noise Schedule. The Noise Schedule shall describe site specific noise management and mitigation measures required to address the specific circumstances and environmental conditions of the affected area, which shall be in addition to the general mitigation measures noted in the CNVMP. The Noise Schedule shall contain the following information:  a) The activity and location of proposed works; b) The timing and duration of the activity; c) The equipment to be used; d) Predicted noise levels; e) Identified dwellings at which compliance cannot be achieved with conventional mitigation measures; f) How affected persons are to be consulted; and g) Alternative management and mitigation measures proposed.  b) The Noise Schedule shall be submitted to the Manager WCC for certification at least five working days prior to the relevant construction activity commencing.  c) The Consent Holder shall implement the measures set out in the Schedule throughout the relevant construction period referred to in the Noise Schedule.			
47	The detailed design of any structural construction noise or vibration mitigation measures (eg. temporary construction noise barriers) as identified in the certified CNVMP, shall be undertaken by a suitably qualified acoustics specialist, and shall			



	be implemented prior to commencement of Construction Phase that necessitates that particular mitigation measure.
48	<p>For residential dwellings located along Moa Point Road and not owned by the Consent Holder, identified on Figure X [to be developed], methods to be adopted within the CNVMP to manage construction noise and vibration shall be formulated by the Consent Holder, having first consulted with the owners and occupiers of these properties. The mitigation could include, but not be limited to:</p> <ul style="list-style-type: none"> <li>• Temporary rehoming during night time construction work</li> <li>• Acoustic insulation and mechanical ventilation within the affected dwelling.</li> </ul> <p>The mitigation shall be undertaken by the Consent Holder in agreement with the owner and/or occupiers of the dwelling prior to the commencement of construction of the reclamation.</p>
49	The Consent Holder shall ensure that any pot-holes or pavement discontinuities along the carriageway of the haulage route, identified in Figure X [to be developed], near residences, are repaired prior to the use of the road by heavy construction traffic. These shall be identified as part of the CTMP.
<b>Network Utilities</b>	
50	In accordance with Condition 17, the Consent Holder shall prepare a Network Utilities Management Plan (NUMP). The purpose of the NUMP shall be to inform the WCC and GWRG and relevant network utility providers that enabling work, design and construction of the Project adequately takes account of (and includes measures to address), the safety, integrity, protection (or, where necessary, relocation of) existing network utilities.
51	<p>The NUMP shall be prepared in consultation with the relevant infrastructure providers who have existing network utilities that are directly affected by the Project. The NUMP shall as a minimum, set out its objectives and intended outcomes and address the following:</p> <ol style="list-style-type: none"> <li>a) Measures to be used to accurately identify the location of existing network utilities;</li> <li>b) Measures for the protection, relocation and/or reinstatement of existing network utilities;</li> <li>c) Measures to ensure the continued operation and supply of infrastructure services;</li> <li>d) Measures to provide for the safe operation of plant and equipment, and the safety of workers, in proximity to live existing network utilities;</li> <li>e) Measures to manage potential induction hazards to existing network utilities;</li> <li>f) Measures to community with the relevant utility service providers during the Construction Phase;</li> <li>g) Earthwork management (including depth and extent of earthwork), for earthwork in close proximity to existing network utilities;</li> <li>h) Vibration management for work in close proximity to existing network utilities; and</li> <li>i) Emergency management procedures in the event of any emergency involving existing network utilities.</li> </ol>

52	The NUMP shall be implemented and maintained throughout the construction phase of the Project and following construction as necessary, and updated if required.
53	Prior to the commencement of construction, the Consent Holder shall undertake consultation with Wellington City Council, Wellington Water and VEOLA, the owner/operator of the Moa Point Sewage Treatment Plant Outfall in order to identify the options to avoid, remedy or mitigate adverse effects arising from the construction of the Project on this outfall structure. The agreed method(s) shall be specified in the NUMP. The measures to appropriately avoid, remedy or mitigate adverse effects on this infrastructure shall be implemented in consultation with Wellington City Council, Wellington Water and Veolia.
<b>Coastal Management</b>	
54	The Consent Holder shall notify the Manager GWRC in writing within 10 working days of the completion of each stage of ground-treatment works, reclamation, structures and revetments within the CMA.
55	The Consent Holder shall supply to the Manager GWRC and the LINZ Hydrographic Services Office and LINZ Topographic Services Office (Chief Hydrographer, National Topo/Hydro Authority, Land Information New Zealand, Private Box PO Box 5501, Wellington 6145), a complete set of as built plans, final topographic and bathymetric data, and appropriate certification confirming that the new reclamation, associated structures, and revetment works have been built in accordance with sound engineering practice, within 60 working days of the completion of the works associated with the reclamation portion of the Project.
56	The Consent Holder shall maintain the site in good order and shall, as far as practicable, remedy all damage and disturbance caused by plant, vehicles and equipment to the foreshore and Open Space B land during construction, to the satisfaction of the Manager GWRC and Manager WCC.
57	The Consent Holder shall ensure the removal of all equipment, erosion and sediment control measures, surplus soil, sediment and construction materials from the CMA within 30 working days following the completion of the construction works.
58	All imported fill material to be used in the reclamations, rock dykes, groynes and temporary fill/surcharge shall be in accordance with the Ministry for the Environment “cleanfill” definition, as detailed in Publication ME418 “A Guide to the Management of Cleanfills, 2002” or subsequent updates.
59	The Consent Holder shall maintain a log recording the source of fill material imported onto each reclamation or temporary and permanent occupation site. This log shall be made available to the Manager GWRC for inspection on request.
60	The Consent Holder shall undertake a further bathymetric survey in eastern Lyall Bay two years following the construction of the rock dyke. The survey that shall be undertaken shall be similar to that described in <b>Technical Report 17</b> in 2014. A hydrographic survey report shall be completed to compare the bathymetric survey results with the 2014 survey results and ascertain any anomalous changes in seabed heights or accretion/deposition patterns. A copy of the survey shall be supplied to the Manager GWRC.

	<b>Erosion and Sediment Control Plan and Monitoring</b>
61	<p>In accordance with condition 17, the Consent Holder shall prepare an Erosion and Sediment Control Plan (ESCP). The purpose of the ESCP is to describe the methods and practices to be implemented to ensure the effects of sediment generated from construction practices associated with the Project on the Lyall Bay coastal environment will be appropriately managed.</p> <p>The ESCP shall, as a minimum, set out its objectives and intended outcomes and address the following:</p> <ul style="list-style-type: none"> <li>a) The identification of appropriately qualified and experienced staff to manage environmental issues associated with sedimentation on-site;</li> <li>b) The identification of staff who have clearly defined roles and responsibilities to monitor compliance with the limits set by these conditions and the requirements of the ESCP and any relevant conditions;</li> <li>c) Provision to ensure effective erosion and sediment control measures are installed prior to and during all construction work, within and adjacent to the coastal marine area;</li> <li>d) Details of the monitoring methodology that will be employed to confirm sediment control devices meet the limits set by these conditions and the requirements of the ESCP and any relevant conditions;</li> <li>e) The responsibilities, procedures and response actions required to ensure that there is a rapid response should the receiving-water turbidity limits set out in condition 64 (below) be exceeded;</li> <li>f) The actions that will be undertaken for sediment control during extreme weather and/or emergency situations; and</li> <li>g) Methods and procedures to be undertaken for decommissioning the erosion and sediment control measures.</li> </ul>
62	<p>The ESCP shall be implemented and maintained throughout the construction phase of the Project and following construction as necessary, and updated if required.</p>

63	<p>In accordance with condition 61 and as part of the ESCP the Consent Holder shall confirm the location of the compliance and control turbidity monitoring sites. Monitoring sites shall be established such that turbidity monitoring is undertaken at a depth of 1.5 m.<sup>46</sup></p> <p>The compliance monitoring site/s shall be located at the outer edge of the near-field zone of reasonable mixing, which shall be 150m from each discharge point within the rock-dyke containing the reclamation.</p> <p>The control sites shall be located within Lyall Bay<sup>47</sup> and be representative of existing ambient conditions and selected based on the following criteria:</p> <ul style="list-style-type: none"> <li>(a) Water depth and wave heights are similar to the compliance site/s.</li> </ul>
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<sup>46</sup> near-surface, but minimising sensor interference with air-bubbles entrained by wave activity.

<sup>47</sup> north of a line between the narrow isthmus of Hue te Taka Peninsula and Waitaha Cove.

	<p>(b) The site/s shall be located away from existing storm water discharge outlets and other land based discharge points to minimise the near-field interference on ambient turbidity within Lyall Bay.</p> <p>The location of the compliance and ambient monitoring sites shall be shown on a map attached to the ESCP.</p> <p>Monitoring undertaken at the compliance site/s and the ambient site/s shall include:</p> <ol style="list-style-type: none"> <li>1. Continuous (telemetered) turbidity sensors and loggers shall be installed, operated and maintained.</li> <li>2. The logged data shall be processed and assessed by the Consent Holder on a daily (24-hour) basis.</li> <li>3. Data processing to extract a 48-hour rolling median, replacing the earliest 24-hour data record with the latest 24-hour data.</li> </ol>
64	<p>In accordance with the ESCP, the following turbidity limits shall be adhered to by the Consent Holder at all times during any works in the coastal marine area or de-watering discharges to the CMA:</p> <ol style="list-style-type: none"> <li>a) When the sensor-calibrated suspended sediment concentrations at the control site/s, using a 48-hour rolling median, are less than 15 mg/L then the maximum suspended sediment concentration allowable at the compliance site/s shall be 25 mg/L;</li> <li>b) When sensor-calibrated suspended sediment concentrations at the control site/s are equal or above 15 mg/L using a 48-hour rolling median, then the suspended sediment concentrations at the compliance site/s shall not exceed the ambient concentrations by more than maximum of an additional 10 mg/L (ambient plus 10 mg/L) based on a 48-hour rolling median.</li> </ol>
65	<p>In the event that the monitoring undertaken in accordance with condition 63, identifies that either of the turbidity limits in condition 64 have been exceeded, then the Consent Holder shall undertake the following:</p> <ol style="list-style-type: none"> <li>a) Within 24 hours of the exceedance being established, carry out and record in writing a full audit of the condition of all erosion and sediment control measures within the construction area, including discharge or seabed disturbance locations, discharge rates and discharge method (eg. pipe, weir);</li> <li>b) Remedy any causes to these measures that may have contributed to the exceedance, as soon as practicable and record what remedial measures were undertaken;</li> <li>c) Assemble information and observations of wave, tide and weather (rainfall, wind) conditions over the previous 48-hours as a background to possible alternative or contributing causes of the exceedance;</li> <li>d) Notify the Manager at GWRC within one working day of the exceedance, including providing details of the exceedance circumstances, and record what measures were undertaken;</li> <li>e) If the monitored turbidity levels remain above the limits set by condition 64 for more than 48 hours and can be attributed to the construction works or</li> </ol>

	<p>discharges, then an investigation into the likely extent of any effects shall be undertaken within three working days;</p> <p>f) Within 10 working days of the investigation being undertaken, in accordance with condition 65(e), a report shall be provided to the Manager GWRC which has been prepared by a suitably qualified and experienced aquatic ecologist/coastal expert and which includes the following:</p> <ul style="list-style-type: none"> <li>• Assessment of the extent of the plume produced which led to the exceedance.</li> <li>• Assessment of the potential effects of the exceedance on soft-bottom and reef communities in the vicinity.</li> </ul> <p>g) Recommendations on actions/mitigation required to avoid future exceedances.</p>
	<b>Wave Focusing Structure – Surf Mitigation Adaptive Management Plan</b>
66	<p>Not less than six months prior to the commencement of the construction of the runway extension the consent holder shall prepare and submit to the Manager GWRC for certification a Surf Mitigation Adaptive Management Plan (SMAMP). The SMAMP shall be prepared by an appropriately qualified expert, following consultation with the steering committee set out in condition 67. The purpose of the SMAMP shall be to provide:</p> <ol style="list-style-type: none"> <li>A description of the key performance design criteria for the wave focusing structure to offset the loss in surfing quality predicted in the middle and western sections of the beach;</li> <li>Confirmation of the proposed location of the wave focusing structure;</li> <li>Details of the methodology and material to be used to construct the wave focusing structure; and</li> <li>Monitoring, reporting and maintenance requirements before, during and following the construction of the wave focusing structure.</li> </ol>
67	<p>Prior to the preparation of the SMAMP, the Consent Holder shall establish a steering committee that incorporates representation from stakeholder groups including, but not limited to, Wellington Board Riders Club and XXXXX. The Steering Committee shall be given the opportunity to:</p> <ol style="list-style-type: none"> <li>Have input into the detailed design phase of the structure in accordance with condition 69 (below);</li> <li>Review baseline monitoring results and provide feedback;</li> <li>Review the draft SMAMP and to provide feedback; and</li> <li>Review the operational results and provide feedback.</li> </ol> <p>The Steering Committee will meet on a regular basis as agreed between the participants. Costs incurred by the Steering Committee shall be met by the Consent Holder.</p>
68	<p>The Consent Holder shall ensure that the key performance design criteria for the wave focusing structure, as described in the SMAMP prepared in accordance with condition 66 achieve the following objectives:</p>

	<ul style="list-style-type: none"> <li>a) That the structure shall be designed to meet the following parameters, in a wide representative range of surfable wave conditions (ranging from average to very good quality conditions): <ul style="list-style-type: none"> <li>(i) the generation of localised wave focusing across its footprint thereby forming pronounced wave peaks; and</li> <li>(ii) after generation, each wave peak shall propagate into shallower water to form peeling waves suitable for surfing (as opposed to waves tending to close-out); and</li> <li>(iii) the overall number and distribution of quality surfable rides post the completion of the runway extension shall be either equal to or better than for existing surfing conditions.</li> </ul> </li> <li>b) That the structure shall not cause an increase in safety risk to swimmers during mild wave and weather conditions;</li> <li>c) That the crest height of the structure shall be low enough to prevent waves breaking on the structure, except during rare periods of exceptionally large wave heights;</li> <li>d) That the structure shall not pose a safety risk to board riders, or other recreational users within Lyall Bay (other than risks normally associated with surfing);</li> <li>e) That the structure shall not cause adverse coastal erosion or accretion;</li> <li>f) That the structure shall be built in such a way that its structural integrity is not compromised by excessive seabed mobility or localised scour; and</li> <li>g) That the material selection and construction method shall not cause any adverse impacts on significant marine habitat or species.</li> </ul>
69	<p>In preparation of the SMAMP prepared in accordance with condition 66, further modelling to confirm the final overall shape, size and position of the submerged wave focusing structure shall be undertaken by an appropriately qualified expert(s) to confirm that the location and design of the structure will meet objectives (a) – (g) of Condition 68. This modelling shall include a review of a range of alternative design iterations and predicted swell events/scenarios that could arise as a result of each. The preferred design shall be selected in consultation with the Steering Committee as set out in condition 67 and the reasons for its selection and predicted swell events/scenarios shall be described in the SMAMP.</p>
70	<p>Before preparing the SMAMP prepared in accordance with condition 66, the Consent Holder shall commission monitoring by an appropriately qualified expert(s) in order to provide additional baseline information which shall include:</p> <ul style="list-style-type: none"> <li>a) An assessment of detailed wave measurements (length, height, period) at the Lyall Bay entrance, 'The Corner', and the anticipated location of the submerged wave focusing structure. Detailed measurements shall be obtained for a period of not less than two months;</li> <li>b) Seasonal surveys of nearshore bed morphology including at the anticipated location of the submerged wave focusing structure; and</li> <li>c) A pre-construction surfing amenity survey.</li> </ul>



71	The monitoring of the sea bed morphology required by condition 70(b) shall be undertaken using LiDAR or similar technology to survey Lyall Bay on a quarterly basis for a period of one year. The purpose of this monitoring shall be to assess and quantify seasonal variations in sediment movements within Lyall Bay.
72	The surfing amenity survey required by condition 70(c) shall entail the use of suitable tracking devices fitted to surf boards to assess the distribution and length of surfable wave rides in Lyall Bay in a range of surf conditions. The study shall involve at least 10 surfers surfing concurrently at agreed locations in Lyall Bay during each event. The survey shall take place over a period of at least three months.
73	<p>The Consent Holder shall ensure that the SMAMP prepared in accordance with condition 66 includes a detailed description of the methodology and materials that will be used in the construction of the submerged wave focusing structure. This shall include, but is not limited to:</p> <ul style="list-style-type: none"> <li>a) Confirmation that the material selected to construct the wave focusing structure has proven durability in the marine environment;</li> <li>b) Confirmation that the wave focusing structure shall be designed to require minimal repair or maintenance for the life of the structure;</li> <li>c) Provision of a construction methodology that takes into account the local characteristics of the site including sourcing of material, construction plant and machinery, construction timeframes, potential risks (i.e. storm events); and</li> <li>d) Detailed design and engineering plans of the wave focusing structure including: <ul style="list-style-type: none"> <li>(i) Location of the wave focusing structure backed by a geo referenced aerial photo. The layout will include as a minimum; exact distance off-shore, orientation in relation to shoreline, plan shape, major axis length and minor axis width, indication of batter slopes, location of nearby natural reef features; and</li> <li>(ii) Typical sections through the wave focusing structure along the major and minor axes sufficient to describe the main elements and significant form variations of the structure. Typical sections will include as a minimum existing seabed levels (relative to AHD), main tidal plane information, design crest heights (relative to AHD), and average properties of structural materials.</li> </ul> </li> </ul>
74	Once the SMAMP prepared in accordance with condition 66 has been certified by the Manager GWRC, the Consent Holder shall prepare and submit to the consent authority relevant construction details.
75	Within six months of completion of the Project, the Consent Holder shall ensure that the submerged wave focusing structure is constructed in accordance with the construction details required by condition 69.
76	Once the submerged wave focusing structure has been established, the Consent Holder shall be required to monitor the effects and performance of the submerged wave focusing structure. This monitoring shall commence within six months of commissioning of the structure, The monitoring requirements shall include:

	<p>a) An assessment of detailed wave measurements at the Lyall Bay entrance, 'the Corner' and the location of the submerged wave focusing structure;</p> <p>b) A survey of nearshore bed morphology including at 'the Corner' and the location of the submerged wave focussing structure in accordance with condition 70(b) ; and</p> <p>c) A surfing amenity survey undertaken in accordance with conditions 70(c).</p> <p>The purpose of this monitoring shall be to provide a comparative analysis of the effects of the structure on wave quality in order to confirm its success and fulfilment of the objectives of the SMAMP. This monitoring shall confirm that the structure is not resulting in any significant adverse effects with respect to sea bed morphology or adverse erosion/accretion, and swimmer and/or recreation safety within Lyall Bay.</p>
77	A report shall be prepared by a suitably qualified and experienced expert summarising the results of the monitoring undertaken in accordance with condition 76 and submitted to the Manager GWRC.
78	If analysis of the monitoring undertaken in accordance with condition 76 determines that the submerged wave focusing structure is not achieving the objectives of the SMAMP, the Consent Holder shall be required to investigate the likely cause, and detail appropriate mitigation or remedial action. This shall be discussed with the steering committee set out in condition 67. If any such mitigation or remedial action is required, this shall be completed within six months of receipt of the monitoring report, subject to any additional consents or approvals being required. A further and ongoing monitoring programme to determine the effectiveness of mitigation measures will also need to be developed and implemented by the Consent Holder.
79	If analysis of the monitoring undertaken in accordance with condition 76 determines that the submerged wave focusing structure is successful in achieving the objectives of the SMAMP, the Consent Holder shall be required to repeat the monitoring set out in conditions 76 to 78, every five years for the duration of the consent.
<b>Ecological Mitigation and Monitoring</b>	
80	<p>In accordance with condition 17, the Consent Holder shall submit an Ecological Mitigation and Monitoring Plan (EMMP). The purpose of the EMMP shall be to:</p> <p>a) Detail the ecological management programme that will be implemented to appropriately manage impacts on the environment, specifically the coastal marine area and habitats, during and after the construction phase of the Project;</p> <p>b) Document the permanent mitigation measures, including the management and maintenance of ecological mitigation;</p> <p>c) Ensure that mitigation has been successful by establishing post construction monitoring and response procedures; and</p> <p>d) The EMMP shall be finalised in consultation with Iwi manawhenua.</p>
81	The objectives of the EMMP shall be to achieve a similar level of habitat and species diversity along the rock dyke post construction of the Project comparative to communities on other reefs in Lyall Bay.

	<p>The EMMP shall include, but not be limited to, information required in other conditions of this consent and details of the following:</p> <ul style="list-style-type: none"> <li>a) The monitoring to be undertaken during construction and post construction as required below;</li> <li>b) Information on how the following outcomes will be achieved: <ul style="list-style-type: none"> <li>(i) Habitat creation or enhancement along the rock dyke for selected species including marine algae and invertebrates, anemones, chitons, snails, lobsters, adult kina and paua;</li> <li>(ii) Monitoring of cultural health indicators as agreed with Iwi, in order to ensure that any potential adverse effects on cultural values such as mauri, are appropriately measured and managed;</li> <li>(iii) Field collection of mobile macro-invertebrates from reefs prior to the construction commencing, and transferring these species to new reef surfaces once construction is completed, in order to mitigate the effects of the destruction of rocky reefs and their resident populations within the construction zone, and speed up the repopulation of the rock dyke;</li> <li>(iv) Methods to determine whether remedial or mitigation measures have been successfully achieved; and</li> <li>(v) How construction activities will be managed if marine mammals (dolphins or whales) are present within 100m of the Project site.</li> </ul> </li> </ul>
82	The EMMP shall be implemented and maintained throughout the Construction Phase of the Project and following construction as necessary, and updated if required.
83	<p>The Consent Holder shall ensure that in designing the rock dyke, the following measures are incorporated:</p> <ul style="list-style-type: none"> <li>a) The addition of roughened/pitted surfaces on 50% of each accropode to increase the range of microhabitats available for colonising marine algae and invertebrates,</li> <li>b) The inclusion of five shallow indented prisms along the arm of each accropode to increase the possibility of at least one forming a rock pool.</li> <li>c) The insertion of one 1m<sup>3</sup> concrete block, with a truncated conical shaped hole in the top layer of the secondary armour, every 10m around the perimeter of the rock dyke somewhere between mean low spring and mean high spring tide levels.</li> <li>d) Accropodes are to incorporate holes of three sizes: small, medium and large. Each 1m<sup>3</sup> of accropode surface shall have a minimum of one hole of each size (i.e. three holes in total).</li> </ul>
84	Prior to the commencement of construction, the Consent Holder shall undertake field collection of mobile macro-invertebrates including, but not limited to, paua, kina, large gastropods and starfish from reefs within the coastal marine area within the reclamation area. These macro-invertebrates shall be held during the construction period in suitable sea water facilities on land, and transferred back to new reef surfaces once the construction is completed.
85	Three years following the construction of the Project, the Consent Holder shall be required to undertake a survey of the reef and benthic environment along the rock

	dyke of the reclamation and other reefs within Lyall Bay. The purpose of this survey shall be to ascertain the level of recolonization of benthic communities and undertake a comparative analysis of the success, compared to existing reefs in Lyall Bay. The results of this survey shall be submitted to the Manager GWRC within 30 days of the survey being completed.
	<b>Landscape and Urban Design</b>
86	<p>In accordance with condition 17, the Consent Holder shall prepare a Landscape and Urban Design Management Plan (LUDMP). The purpose of the LUDMP is to outline the methods and measures that will be implemented by the Consent Holder to achieve good quality detailed design of the Project particularly in areas that will be accessible to the public, post operation of the runway extension, including part of Moa Point Road, the eastern part of Moa Point Beach, along the Lyall Bay promenade and the roadway under the runway extension.</p> <p>The LUDMP shall be prepared by a suitably qualified and experienced urban designer and landscape architect, with inputs from other experts (e.g. terrestrial/aquatic ecologist) and stakeholders (eg. the CLG, Wellington City Council, Iwi) as appropriate. The LUDMP shall relate to the areas specified in <b>Technical Assessments 23 and 24</b> and Figures 11 to 16, including areas of:</p> <ul style="list-style-type: none"> <li>a) Moa Point Road</li> <li>b) Moa Point Beach</li> <li>c) Airport Road and Moa Point Road intersection</li> <li>d) Roadway under the runway extension</li> <li>e) Lyall Bay promenade</li> </ul> <p>The LUDMP shall include the ongoing maintenance requirements associated with the urban design features and how this will be managed in the long term, in agreement with WCC.</p> <p>Works associated with the LUDMP shall be completed by the Consent Holder prior to the completion of the Project.</p>
	<b>Archaeology and Cultural</b>
87	<p>The Consent Holder shall, in consultation with Iwi, and Heritage New Zealand, prepare an Accidental Discovery Protocol to be implemented in the event of accidental discovery of archaeological sites during the construction of the Project. This protocol shall be adhered to at all times during the construction of the Project. The protocol shall include, but not be limited to:</p> <ul style="list-style-type: none"> <li>a) Training procedures for all contractors regarding the possible presence of cultural or archaeological sites or material, what these sites or material may look like, and the relevant provisions of the Historic Places Act 1993, if any sites or materials are discovered;</li> <li>b) Parties to be notified in the event of an accidental discovery shall include, but need not be limited to Iwi, the Heritage New Zealand, GWRC, WCC, and if kōiwi are discovered, the New Zealand Police;</li> <li>c) Procedures to be undertaken in the event of an accidental discovery (these shall include immediate ceasing of all physical work within 50m of the discovery);</li> </ul>

	<p>d) Procedures to be undertaken before any construction work can recommence within 50m of the discovery. These shall include allowance for appropriate tikanga (protocols), recording of sites or materials, recovery of any artefacts, and consulting with Iwi, and the Heritage New Zealand prior to recommencing work.</p>
88	<p>If taonga (Maori artefacts such as carvings, stone adzes, and greenstone objects) are discovered, the procedure set out for the discovery of archaeological sites (above) must be followed, and the following procedure will apply to the taonga themselves:</p> <ul style="list-style-type: none"> <li>a) The area of the site containing the taonga will be secured in a way that protects the taonga as far as possible from further damage.</li> <li>b) The Consent Holder will then inform Heritage New Zealand and the nominated tangata whenua representative so that the appropriate actions (from cultural and archaeological perspectives) can be determined.</li> <li>c) Work may resume when advised by Heritage New Zealand or the archaeologist.</li> <li>d) The archaeologist will notify the Ministry for Culture and Heritage of the find within 28 days as required under the Protected Objects Act 1975. This can be done through the Auckland War Memorial Museum.</li> <li>e) The Ministry for Culture and Heritage will consult with interested parties to establish claims for ownership. Ownership is ultimately determined by the Māori Land Court. If the taonga requires conservation treatment, the Ministry for Culture and Heritage should be contacted immediately and their staff will make the necessary arrangements.</li> </ul>
89	<p>The Consent Holder shall, at least once every three months during the construction of the Project, and annually for a period of five years post construction, offer to meet with Iwi manawhenua and/or its representatives. The purpose of these meetings shall be to keep Iwi up to date on the progress of the Project, identify any issues during construction and to follow up on the results of the ecological mitigation set out in conditions 81 - 85.</p>

## 9. STATUTORY ASSESSMENT

### 9.1 INTRODUCTION

This chapter considers the relevant statutory planning framework under the RMA against which the resource consent applications for the proposed runway extension are to be assessed. The statutory considerations are set out in **Appendix B** and an assessment against those which are relevant to this Project follows.

### 9.2 NATIONAL POLICY STATEMENT – NZ COASTAL POLICY STATEMENT 2010

Section 104(1)(b)(iv) of the RMA requires consent assessments to have regard to the provisions of the New Zealand Coastal Policy Statement 2010 (**NZCPS**). This is of particular relevance where, as here, the relevant regional planning instruments have not yet been fully reviewed in accordance with the statutory requirement to “give effect” to the NZCPS under Section 67(3)(b) of the RMA. The coastal component of the Proposed Regional Plan was notified on 31 July 2015.

The NZCPS provides policy guidance and direction on management of the coastal environment and CMA. The proposed runway extension will have a direct impact on the coastal environment and the CMA. Matters of relevance that are addressed in the NZCPS include:

- Safeguarding of the integrity, form, functioning and resilience of the coastal environment;
- Preservation of natural character of the coastal environment and appropriate protection of natural features and landscape values;
- Taking into account the principles of the Treaty of Waitangi, and kaitiakitanga in relation to coastal environments;
- Maintaining and enhancing public access and recreational opportunities;
- Management of coastal hazards; and
- Provision of appropriate subdivision, use and development of the coastal environment.

#### 9.2.1 NZCPS Objectives and Policies

There are seven overarching objectives of the NZCPS, all of which are relevant to the consideration of this Project. These set out the high level direction for management of activities within the CMA and coastal environment, and the policies seek to give effect to that direction. An assessment of the Project against the relevant objectives and policies follows.

#### 9.2.2 The Extent and Characteristics of the Coastal Environment<sup>48</sup>

The Project will involve the reclamation and ongoing occupation of the CMA within Lyall Bay, construction and ongoing effects will also affect other parts of the area

<sup>48</sup> Objectives 1 and 2, Policies 1 and 4.



defined as comprising the ‘coastal environment’ in Policy 1 of the NZCPS. The assessments that have been undertaken in support of this application have considered the effects of the construction and ongoing occupation of the proposed runway extension with regard to coastal water quality, marine ecology and coastal processes. The assessments conclude that while there will be permanent effects arising from the reclamation of a portion of the CMA, including ecological habitat loss and changes to the wave patterns in Lyall Bay, these effects are not significant, and can be mitigated.

Effects of the proposed runway extension on the coastal environment in terms of landscape, visual and natural character values have also been assessed. The most significant of these effects will arise for those living closest and with direct views of the Project site and those using public spaces in close proximity to it, especially to the east of the runway. On the western side, given that the form and design of the extension will be similar to what already exists, a high level of integration with the existing environment will be able to be achieved. It is assessed that overall the effects on landscape, visual and natural character values will not be significant.

### 9.2.3 Treaty of Waitangi, Tangata Whenua and Maori<sup>49</sup>

WIAL has engaged with tangata whenua and an understanding of the cultural values that exist within the area has been obtained. It is recognised that iwi has a long association with the coastal environment and CMA within the Lyall Bay and Cook Strait environs.

The CIAs have not identified any sites of significance that will be directly affected by the proposed runway extension. However it is recognised that construction activities and the reclamation could compromise the mauri of coastal water resources through the loss of habitat, discharges and contamination. Maintaining an appropriate level of water quality in the CMA during construction and mitigating the effects of habitat loss through proposed ecological enhancements is therefore required to also manage the effects on cultural values identified. Iwi also utilise the area for recreational and commercial pursuits such as fishing, surfing and other sporting activities. WIAL will continue to consult with iwi throughout the planning and construction phases of the Project, and provide opportunities for tangata whenua to contribute to the development of monitoring and mitigation programmes (eg. water quality, ecology).

### 9.2.4 Natural Character and Landscape

Objective 2 of the NZCPS seeks to:

*“preserve the natural character of the coastal environment and protect natural features and landscape values through:*

- *recognising the characteristics and qualities that contribute to natural character, natural features and landscape values and their location and distribution;*
- *identifying those areas where various forms of subdivision, use, and development would be inappropriate and protecting them from such activities; and*
- *encouraging restoration of the coastal environment”.*

<sup>49</sup> Objective 3 and Policy 2.

In addition, Policy 13 of the NZCPS seeks:

1. *“To preserve the natural character of the coastal environment and to protect it from inappropriate subdivision, use, and development:*
  - (a) *avoid adverse effects of activities on natural character in areas of the coastal environment with outstanding natural character; and*
  - (b) *avoid significant adverse effects and avoid, remedy or mitigate other adverse effects of activities on natural character in all other areas of the coastal environment; including by:*
  - (c) *assessing the natural character of the coastal environment of the region or district, by mapping or otherwise identifying at least areas of high natural character; and*
  - (d) *ensuring that regional policy statements, and plans, identify areas where preserving natural character requires objectives, policies and rules, and include those provisions.*
  
2. *Recognise that natural character is not the same as natural features and landscapes or amenity values and may include matters such as:*
  - (a) *natural elements, processes and patterns;*
  - (b) *biophysical, ecological, geological and geomorphological aspects;*
  - (c) *natural landforms such as headlands, peninsulas, cliffs, dunes, wetlands, reefs, freshwater springs and surf breaks;*
  - (d) *the natural movement of water and sediment;*
  - (e) *the natural darkness of the night sky;*
  - (f) *places or areas that are wild or scenic;*
  - (g) *a range of natural character from pristine to modified; and*
  - (h) *experiential attributes, including the sounds and smell of the sea; and their context or setting”.*

As described in **Technical Report 25** natural character is generally assessed on a continuum of modification that describes the expression of natural elements, patterns and processes (or the ‘naturalness’) in a coastal landscape/ecosystem. As natural character is assessed over a continuum from highly natural (pristine) to totally modified (urban environment), half of the continuum can be considered to be predominately “natural”, and conversely the other half predominately “modified”.

In accordance with Objective 2 of the NZCPS the natural character assessment has considered the natural character values along the terrestrial and marine coastal edge in close proximity to the Airport, and it has also considered Lyall Bay as a whole and in context of the wider south coast around Wellington.

At a broad scale, the assessments find that the south coast is seen as being ‘wild and natural’ and has a high level of natural character. The low level of development over much of the south coast is confined largely because of the narrow coastal platform and the ruggedness of the landforms. These aspects together with the often extreme climate and weather events all contribute to this perception of isolation and wildness.

In general terms, much of the south coast retains relatively high levels of natural character with areas of modification occurring within some of the more developed bays such as Island Bay, Houghton Bay, Lyall Bay, Breaker Bay and the Seatoun area.

The assessment does not find the area in and around Lyall Bay as possessing outstanding natural character. Nor is the area identified as being outstanding in natural character terms in any regional or district planning document.

In addressing natural character in the immediate area that will be affected by the proposed runway extension, the report describes how the original and ongoing development of the Airport and surrounding developments has already had a significant effect on natural character. Construction of the existing runway has extensively modified the eastern edge of Lyall Bay, creating a linear, rock armoured edge extending 800m from Lyall Bay beach southwards. The breakwater that extends 150m into Lyall Bay also forms part of this artificial edge.

The assessment categorises the Lyall Bay area around the extension into six inshore component areas and two offshore component areas. The two peninsula landforms that define Lyall Bay (Hue te Taka and Te Raekaihau Point) which have been assessed as having high natural character, will not be adversely affected by the proposed runway extension. The existing level of natural character will remain unchanged.

While there will be some changes and potential adverse effects on some natural character attributes on the eastern side of Lyall Bay, the bay's overall level of natural character will largely remain unchanged following the construction of the airport runway extension. The natural character of Lyall Bay beach, which is currently assessed as being moderate/low overall, will remain the same following the construction of the proposed runway extension.

The greatest level of change to natural character will occur in the Airport and the Moa Point Embayment areas, where the overall natural character will be reduced from low to very low in the Airport area and from moderate/low to low in the Moa Point Embayment area. These changes, while adverse will not be significant in terms of Policy 13(1)(b), and can in part be mitigated.

Turning to the natural character of the CMA, it is confirmed in the technical assessments relating to ecology and coastal processes (refer **Technical Reports 15 - 19**), the proposed runway extension will not give rise to significant adverse effects on ecologically significant habitats, marine species or coastal wave patterns or processes. Although the reclamation will result in the loss of an area of CMA habitat, the assessments consider that these losses are not significant, as the species affected are common throughout the Wellington south coast. Moreover, mitigation measures such as species collection and habitat enhancement is proposed to be incorporated into the design of the rock dyke, such that species are likely to recolonise post construction.

The effects on the biological attributes of terrestrial natural character within the immediate area will be unchanged and very low as no areas of habitat or flora and fauna will be adversely impacted, apart from a small area of planting along the coastal

edge along Moa Point Road. The proposed mitigation measures provide for more planting to improve and enhance terrestrial habitats.

The assessment of natural character notes that it is likely that there will be changes in wave patterns within the Moa Point Embayment area and within the wider Lyall Bay as a result of the proposed runway extension. These changes may adversely affect the experiential values of these areas, and mitigation (such as Moa Point Beach enhancement and the SWFS) is proposed.

For residents of Moa Point Road the effect of the Project on the way they experience the Moa Point embayment will change and for some this will be a significant change. In relation to aspects such as their visual perceptions and the effects of the Project on amenity values, the effects will be greater and probably adverse for these residents. Mitigation measures such as the proposed improvements to the Moa Point Beach area and the 'south coast gateway' are intended to assist with moderating these effects for the residents and transient visitors to the area. These enhancements are also generally consistent with the intent of Policy 14 of the NZCPS which seeks to restore and rehabilitate natural character.

Temporary adverse effects on natural character will occur during the reclamation and runway construction process, including increased water turbidity affecting water quality, displacement of paua and kina populations, habitat displacement, and disruption to some recreation activities, public exclusion and effects on experiential attributes. These effects will only be apparent during the 18 to 36 month construction phase of the Project and can be mitigated through appropriate erosion and sediment control measures, monitoring of water quality and implementation of habitat enhancement measures.

Policy 15 sets out a similar cascading approach to the management of activities within natural landscapes and seascapes. It seeks:

*To protect the natural features and natural landscapes (including seascapes) of the coastal environment from inappropriate subdivision, use, and development:*

- (a) avoid adverse effects of activities on outstanding natural features and outstanding natural landscapes in the coastal environment; and*
- (b) avoid significant adverse effects and avoid, remedy, or mitigate other adverse effects of activities on other natural features and natural landscapes in the coastal environment; including by:*
- (c) identifying and assessing the natural features and natural landscapes of the coastal environment of the region or district, at minimum by land typing, soil characterisation and landscape characterisation and having regard to:*
  - i. natural science factors, including geological, topographical, ecological and dynamic components;*
  - ii. the presence of water including in seas, lakes, rivers and streams;*
  - iii. legibility or expressiveness – how obviously the feature or landscape demonstrates its formative processes;*
  - iv. aesthetic values including memorability and naturalness;*
  - v. vegetation (native and exotic);*

- vi. *transient values, including presence of wildlife or other values at certain times of the day or year;*
- vii. *whether the values are shared and recognised;*
- viii. *cultural and spiritual values for tangata whenua, identified by working, as far as practicable, in accordance with tikanga Māori; including their expression as cultural landscapes and features;*
- ix. *historical and heritage associations; and*
- x. *wild or scenic values;*

The landscape assessment (refer **Technical Report 24**) has not identified any outstanding natural landscapes or features that will be affected by the proposed runway extension. This is supported by the regional and district planning instruments which do not identify this part of the Wellington coast as being outstanding in landscape terms.

Many of these natural features at Lyall Bay have been modified as a result of the development and activities that currently occur. WCC's South Coast Management Plan recognises that there are natural attributes in this part of the south coast but acknowledges that the Airport development and that associated with other infrastructure has affected existing landscape and amenity values. Natural features that exist (such as ecological components) will not be significantly adversely affected by the Project and there are measures proposed to mitigate these effects.

The effects on landscape and seascape character will be different on the eastern and western sides of Lyall Bay. The significance of effects on the landscape/seascape character is assessed as being high during construction and moderate at completion within the Moa Point Embayment located on the eastern side of the runway and moderate/low on the broader western side. While the runway will project further into the bay, it will not introduce new landscape elements; its form and the nature of the materials used to construct it will be similar to what already exists. In the context of the modified Lyall Bay landscape/seascape the effects of the proposed runway extension while visible will neither be significant nor adverse.

### 9.2.5 Water Quality

Objective 1 seeks that in safeguarding the integrity, form, functioning and resilience of the coastal environment and sustaining its ecosystems coastal water quality is to be maintained and enhanced, particularly where it has deteriorated from what would otherwise be its natural condition. Similarly, Policy 21 requires that where water quality in the coastal environment has deteriorated such that it is having a significant adverse effect, priority will be given to enhancing it. Policy 22 requires consideration of controls to manage the effects of sedimentation on the coastal environment. Policy 23 seeks to manage discharges to water in the coastal environment.

Construction of the proposed runway extension will give rise to some effects on water quality, which will generally arise from the disturbance of sediment and discharges during the infilling of the reclamation. The Regional Coastal Plan identifies that the majority of the coastal waters surrounding the proposed reclamation site are to be managed in order to maintain a quality suitable for contact recreation purposes. To the

east an area is identified as being of a quality suitable for shellfish gathering and consumption<sup>50</sup>.

The assessments relating to water quality (**Technical Reports 15 – 19**) identify that Lyall Bay currently receives stormwater from 283ha of fully developed urban catchment with stormwater contaminant loads discharged through a series of outfalls located at Lyall Bay beach, Moa Point and near the breakwater at the southern end of the airport runway. The outer part of the bay receives treated wastewater from the Moa Point Wastewater Treatment Plant. Despite these existing discharges, the assessments have found that water quality is currently very good in the bay and chemical contaminants are not having an adverse effect on ecological values ascribing to the bay. Because of the dynamic wave and current environment and the moderate to well sorted fine sand sediments with low levels of mud (2-5%), contaminants in the surficial sediments are also very low and uniformly distributed across the area. Contaminant levels are at least two orders of magnitude less than the ANZECC guidelines.

Contaminants released from disturbed benthic sediments during reclamation could potentially bioaccumulate and become concentrated in species at the top of the food chain (large benthic fauna like cockles and eventually large fishes, birds, marine mammals). In turn this could affect human health if contaminants were at high enough levels. However the assessments undertaken have found that the sediments in the area affected by the Project are very low in contaminants. As such the risk of adverse effects arising from the disturbance of the seabed is negligible.

The likelihood of sedimentation occurring from this source is assessed as being low, and if it does occur any adverse effects are likely to be very localised and short term, due to the fact that the coastal area where the runway reclamation is located is very exposed to high waves and swells. These events ensure that any material settling out would be rapidly remobilized and dispersed.

The discharge of suspended sediment into the CMA has been identified as a potential effect arising from the construction activities and more predominately during the infilling of the reclamation.

TSS concentrations in Lyall Bay are already up to 16 mg/L or more during storm events (based on the outer bay mooring; 8-m depth). Modelling undertaken by NIWA has identified that increased levels of suspended sediment arising from construction would be confined to an area of approximately 150m of the discharge point during construction and with greater near-field mixing and dispersion of the plume occurring during storms and strong wind events. Generally over the wider area of Lyall Bay (several-hundred metres from the discharge), the “above background” contribution from a dyke sediment discharge would be less than 5–10 mg/L (for a 1 kg/s sediment discharge) and less than 10–16 mg/L (2 kg/s sediment discharge) during calm conditions, but will likely vary depending on the discharge location. It has been assessed that most of the benthic and reef communities within the Lyall Bay area are reasonably tolerant to episodic high suspended sediment levels due to storms and high energy wave events. The assessment has also concluded that adverse effects on

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<sup>50</sup> Planning Map 8D.



fish species, birds or other marine mammals arising from discharges during construction are not likely to occur.

Mitigation to minimise adverse effects arising from the release of sediment will be incorporated into the construction methodology and implemented via the ESCP. These measures may include deploying silt curtains around the working areas and using construction equipment and methodologies that minimise excessive disturbances of the seabed. The use of clean fill will also assist to mitigate such effects.

In addition to these mitigation measures, monitoring of suspended sediment levels relative to the existing ambient conditions (ie. to cater for storm events where turbidity levels will already be elevated) is proposed. Conditions require that appropriate water quality limits be adhered to. These limits have been set to recognise that in some circumstances, ambient conditions will be highly influenced by storm or large wave events.

### 9.2.6 Public Open Space and Recreation

Objective 4 seeks to maintain and enhance the public open space qualities and recreation opportunities of the coastal environment by:

- Recognising that the CMA is an extensive area of public space for the public to use and enjoy;
- Maintaining and enhancing public walking access to and along the coastal margin, and where there are exceptional reasons that mean this is not practicable, providing alternative linking access close to the CMA; and
- Recognising the potential for coastal processes, including those likely to be affected by climate change, to restrict access to the coastal environment and the need to ensure that public access is maintained even when the CMA advances inland.

Policy 18 recognises the need for public open space within and adjacent to the CMA, for public use and appreciation including active and passive recreation. It seeks to provide for such open space, including by (among other means) ensuring that the location and treatment of public open space is compatible with the natural character, natural features and landscapes, and amenity values of the coastal environment, and recognising the important role that esplanade reserves and strips can have in contributing to meeting public open space needs.

Policy 19 relates to walking access. It recognises the public expectation and need for walking access to and along the coastal margin. The policy also seeks to maintain and enhance public walking access to, along and adjacent to the CMA, but with express exclusions.

It is recognised that the coastal environment in and around Lyall Bay and the Moa Point area is popular for existing recreational pursuits. Activities include walking, cycling, fishing, plane spotting, surf lifesaving, surfing and swimming. During construction of the reclamation and associated activities there may be some temporary displacement or disruption to activities in and around the construction site in particular. For the most part any displacement of existing recreational activities during

construction, ie. public access landward and within the CMA around the construction area will be imposed only to ensure public health and safety is maintained, and such limitations will be temporary.

The proposed runway extension will result in the loss of approximately 10.82 ha of the CMA and access around most of the edge of the runway adjacent to the CMA will be restricted due to the need to maintain public safety. This effect is intended to be offset by improving the Moa Point Road and beach amenity/public access opportunities. These features will be implemented and managed in the long term in agreement with WCC as landowner as set out in the LUDMP and a Memorandum of Understanding. Ecological enhancement and habitat recreation is also expected to advance the recolonisation of benthic communities that may contribute to fishing and diving opportunities in the immediate area.

The proposed runway extension will likely give rise to changes to the surfing amenity within Lyall Bay. These changes are described in **Technical Report 11**. The NZCPS does not identify the Lyall Bay surf break as being of national significance in accordance with Policy 16. It is noted that the Proposed Natural Resources Plan includes a proposed Appendix K, which includes Lyall Bay as a “regionally significant surf break”.

The little used surf break ‘Airport Rights’ is within the proposed footprint of the reclamation and will be lost as a result of the extension. For other surfing locations within Lyall Bay (The Corner, Middle Beach and West Beach) the extension is predicted to reduce “wave peakiness” (which enables the wave to break on a peak and then be rideable).

Mitigation is proposed in the form of a SWFS. This structure would be designed to offset the effects of the reclamation on surfing amenity by enabling a more consistent surfing opportunity within Lyall Bay. The SWFS would create a left and right breaking wave which does not currently exist today, and will ensure that a similar or improved surfing opportunity is maintained in the long term consistent with Objective 4 of the NZCPS. The construction, ongoing maintenance and monitoring of the effectiveness of the SWFS will be managed via adherence to a series of proposed conditions which are set out in Chapter 8.

Overall it is considered that once the Project has been completed the open space and recreation access and opportunities in the immediate area will be maintained and enhanced through the implementation of the mitigation features described above.

### 9.2.7 Coastal Hazards

Objective 5 relates to the management of coastal hazard risk, taking into account climate change effects. Policies 24 to 27 relate to the management of coastal hazard risk and seek to identify coastal hazard areas and manage potential risks appropriately over at least the next 100 years.

It is acknowledged that the proposed runway extension is located within a low lying area of the coastal environment and is therefore subject to coastal hazard risks such as high energy wave events and storm surges. Acknowledging this coastal location,

one of the primary design parameters applied by AECOM in undertaking preliminary design work for the Project was that the runway platform must be able to withstand a 2,500 year seismic event, and without catastrophic failure a 100 year wave event. NIWA has undertaken an assessment (refer **Technical Report 15**) in terms of potential for the Project to be influenced by sea level rise and other climate change effects such as increased wave generation and storm surge events.

The analysis undertaken has concluded that these climate induced changes would not endanger the current runway and air side areas adjacent to the runway, and would have a lesser effect on the proposed runway extension due to the proposal to finish ground levels at a level which is greater than the elevation of the existing Airport runway. The southern end of the current runway is 8m above the Wellington Vertical Datum 1953 (WVD-53), or 7.8m above the present MSL, which is currently at 0.2m above WVD-53. The proposed runway extension will continue an existing upward incline to reach a height of approximately 9m WVD-53 at the southern end.

With regard to the proposed runway extension's effects on coastal processes (ie sedimentation and beach morphology), other than the changes to wave heights as discussed above, the effects on coastal physical processes are assessed as being low or negligible.

## 9.2.8 Use and Development

Objective 6 of the NZCPS seeks:

*"To enable people and communities to provide for their social, economic and cultural wellbeing and their health and safety, through subdivision, use and development recognising that:*

- *The protection of the values of the coastal environment does not preclude use and development in appropriate places and forms, and within appropriate limits;*
- *some uses and developments which depend upon the use of natural and physical resources in the coastal environment are important to the social, economic and cultural wellbeing of people and communities;*
- *functionally some uses and developments can only be located on the coast or in the coastal marine area;*
- *the proportion of the coastal marine area under any formal protection is small and therefore management under the Act is an important means by which the natural resources of the coastal marine area can be protected*

*..."*

Policy 6 seeks (among other matters) to recognise that the provision of infrastructure is an activity which is important to the social, economic and cultural wellbeing of people and communities, and should be enabled to provide for the reasonably foreseeable needs of the population growth without compromising other values of the coastal environment. With regard to the CMA this policy seeks to recognise the need to maintain and enhance public open space and recreational qualities and values of the CMA, and (among other matters) recognise that there are activities that have a

functional need to be located in the CMA. Such activities are to be provided for in appropriate places.

The development of the Airport has had a direct influence on the form and function of the surrounding environment. Substantial reclamation to build the Airport in its present configuration initially has resulted in a significant change to the original form of Lyall Bay. Continuing to develop the Airport at its current location is consistent with the planned urban form for the city and its projected growth in nodal centres and transportation network.

Aircraft passenger numbers are expected to grow and it has been identified that a viable long haul route to and from Wellington exists. Extending the runway further into Lyall Bay will enable Wellington Airport to provide for long haul connections which will result in benefits including enhanced connectivity, a reduction in travel times, and generate economic growth for the region and boost the tourism and education sectors (refer **Technical Report 4**).

Policy 10 of the NZCPS is directly relevant to the assessment of reclamation activities. It seeks to:

1. *Avoid reclamation of land in the coastal marine area, unless:*
  - a. *land outside the coastal marine area is not available for the proposed activity;*
  - b. *the activity which requires reclamation can only occur in or adjacent to the coastal marine area;*
  - c. *there are no practicable alternative methods of providing the activity;*  
*and*
  - d. *the reclamation will provide significant regional or national benefit.*
2. *Where a reclamation is considered to be a suitable use of the coastal marine area, in considering its form and design have particular regard to:*
  - a. *the potential effects on the site of climate change, including sea level rise, over no less than 100 years;*
  - b. *the shape of the reclamation and, where appropriate, whether the materials used are visually and aesthetically compatible with the adjoining coast;*
  - c. *the use of materials in the reclamation, including avoiding the use of contaminated materials that could significantly adversely affect water quality, aquatic ecosystems and indigenous biodiversity in the coastal marine area;*
  - d. *providing public access, including providing access to and along the coastal marine area at high tide where practicable, unless a restriction on public access is appropriate as provided for in Policy 19;*
  - e. *the ability to remedy or mitigate adverse effects on the coastal environment;*

- f. *whether the proposed activity will affect cultural landscapes and sites of significance to tangata whenua; and*
  - g. *the ability to avoid consequential erosion and accretion, and other natural hazards.*
3. *In considering proposed reclamations, have particular regard to the extent to which the reclamation and intended purpose would provide for the efficient operation of infrastructure, including ports, airports, coastal roads, pipelines, electricity transmission, railways and ferry terminals, and of marinas and electricity generation.*

WIAL has identified that the potential exists to connect central New Zealand with destinations in Asia and USA with direct long haul flights to and from the Airport. An extension to the operational runway of approximately 355m is needed for this to occur. However as discussed earlier in this report the Airport is currently constrained at either end of the existing runway by the presence of the CMA so an extension into the CMA will necessarily require a significant engineered solution. Alternative engineering options including extending the runway north, or to the south or a combination of both, and differing construction methodologies (ie. platform over the CMA vs reclamation) have been considered. The most feasible option from an engineering and effects perspective is an extension via reclamation to the south of the existing runway. Relocating the Airport has also been considered, but this is not considered to be a viable or efficient option.

As described in Chapter 2 of this report, extending the runway will enable significant regional and national benefits to be realised. The CBA (refer **Technical Report 4**) concludes that on the current Government guidelines the runway extension would produce a net economic benefit for the nation of around \$2 billion in today's dollars. This would be derived from benefits such as reduced air travel fares, increased visitor numbers and incremental spending. The proposed runway extension also aligns with a number of national, regional and district policies and strategic documents including Tourism 2025, Wellington Regional Strategy (**WRS**) and the Long Term Plan for Wellington City. These documents seek to improve national transportation infrastructure and enhance Wellington's connectivity.

Overall it is considered that the activity requires a reclamation into the CMA. This is due to the location of the Airport, that there are no practical alternatives and that significant national and regional benefits will arise from the enhanced operation and growth of the Airport.

As discussed above, features of the design of the reclamation (ground level and size of accropodes) are key in mitigating any potential coastal hazard effects including climate change induced risk such as sea level rise.

The shape of the reclamation is driven by its end purpose, being the use of a runway including a REPA. Given this the proposed reclamation cannot be practically shaped or reduced in scale to generate a more natural coastal edge. The design concept for the reclamation has therefore been to adopt a shape that is simple and linear in its form. The proposal is to emphasise the linearity of the extension by treating it as an

extension of the existing runway and to be seen as projecting deck or wharf into the bay.

On the western, more urban side, the existing Airport runway has formed a straight edge projection into Lyall Bay and the proposal is to continue this line. Because the runway sits at the interface to the more urban Lyall Bay and the more natural edge of the south coast to the east, the treatment of the form varies from one side to the other. On the east side there is an opportunity to rectify a currently poor connection between the existing Airport reclamation and the beach and to extend a new curved beach line to reinstate a higher level of visual amenity and reinforce the landscape and ecological values of the east side of the Airport.

One of the recommendations from the ecological and coastal processes assessments is that clean material is used in the construction of the reclamation, preferably which is marine sourced and low in silts. Although the fill material has not yet been finalised, WIAL agrees that utilising material of a suitable quality to be used in the CMA should be a requirement.

Public access to the CMA is currently restricted around the edge of the existing runway due to Airport operational and public safety reasons. Post construction of the reclamation, public access will still need to be restricted, however it is proposed to improve access along other areas of the coast from that provided currently by extending a shared path along the edge of Moa Point Road on the western side. Access will also be provided for on part of the eastern side of the proposed runway extension from a new bay coastal landscape with a 'rock hopping' type path. This is however subject to a public health and safety and aeronautical safety audit to confirm its appropriateness in this locality. Consistent with Policy 19(3) of the NZCPS there are safety reasons for providing full public access around the complete perimeter of the runway extension. The runway end will be subject to extreme conditions in large wave events and Airport security is also a concern.

As discussed above, there are no known sites of cultural significance that will be affected by the proposed reclamation. Maintaining an acceptable level of water quality and managing the effects on aquatic ecology are however important from an iwi perspective. Mitigation as described above will seek to also address potential effects on cultural values within the CMA. WIAL will continue to engage with iwi representatives through the construction of the Project and volunteers appropriate conditions to that end.

An assessment of the proposed reclamation on coastal processes (i.e. waves, beach morphology) has been undertaken (refer **Technical Report 15**), aside from changes to the wave environment within Lyall Bay, the effects on other coastal processes are expected to be negligible.

With regard to Policy 10(3), the proposed reclamation and proposed runway extension would provide for the ongoing efficient use of Wellington Airport. The operational capacity of the Airport is constrained by the current runway length and coastal location. Extending the runway in the manner proposed would overcome these existing



constraints and enable the ability for the Airport to cater for wide bodied aircraft with the potential to fly long haul to and from Wellington directly.

### 9.2.9 Indigenous Biodiversity

Policy 11 seeks to protect indigenous biological diversity in the coastal environment by avoiding adverse effects on:

- i. indigenous taxa that are listed as threatened or at risk in the New Zealand Threat Classification System lists;*
- ii. taxa that are listed by the International Union for Conservation of Nature and Natural Resources as threatened;*
- iii. indigenous ecosystems and vegetation types that are threatened in the coastal environment, or are naturally rare;*
- iv. habitats of indigenous species where the species are at the limit of their natural range, or are naturally rare;*
- v. areas containing nationally significant examples of indigenous community types; and*
- vi. areas set aside for full or partial protection of indigenous biological diversity under other legislation;*

And by avoiding significant adverse effects and avoiding, remedying or mitigating other adverse effects on:

- i. areas of predominantly indigenous vegetation in the coastal environment;*
- ii. habitats in the coastal environment that are important during the vulnerable life stages of indigenous species;*
- iii. indigenous ecosystems and habitats that are only found in the coastal environment and are particularly vulnerable*
- iv. to modification, including estuaries, lagoons, coastal wetlands, dunelands, intertidal zones, rocky reef systems, eelgrass and saltmarsh;*
- v. habitats of indigenous species in the coastal environment that are important for recreational, commercial, traditional or cultural purposes;*
- vi. habitats, including areas and routes, important to migratory species; and*
- vii. ecological corridors, and areas important for linking or maintaining biological values identified under this policy.*

Although the reclamation will result in some loss of habitat, no rare or unique species or assemblages will be lost and the communities that are present have been found to be typical of the south Wellington coast. One species that was found an “*undescribed red algae*” has not to date been found elsewhere on the Wellington south coast, however it has been recorded as being in Otago and is likely to be more widespread but has not been recorded. It is recommended however that if this species is found on boulders or on substrate that can be moved, there is the potential to relocate the population within an area along the south coast where there would be similar conditions. Some of the reef communities that would be lost in the immediate vicinity would be mitigated in part by the development of rock wall communities around the reclamation and efforts to hasten the recolonisation of the area.

There is a small possibility that a few penguins may be temporarily displaced but this represents a very small part of the “Wellington population”. Most shore and seabirds and marine mammals will forage over a large area and there is no evidence that this area is particularly important. Due to the nature of the construction activities, birds, fish and marine mammals are also likely to instinctively avoid the area. A temporary exclusion zone around the construction zone will be in place for the period it takes for the runway to be extended. This is not likely to affect any commercial fisheries as none operate within this distance of the present southern end of the runway. However, some recreational and customary fishing activities will be affected on a temporary basis.

Although the esplanade area around the edge of the existing runway is zoned for Open Space purposes, there are no significant indigenous vegetation communities that are present that will be adversely affected by the proposed runway extension. In addition, planting of native vegetation and beach nourishment will also mitigate any loss of individual species during the construction phase.

### 9.3 WELLINGTON REGIONAL POLICY STATEMENT

The Regional Policy Statement (**RPS**) for the Wellington region became operative in April 2013. A full assessment of the Project has been undertaken against the objectives and policies of the RPS and this is provided below.

Under section 59 of the RMA “the purpose of a regional policy statement is to achieve the purpose of the Act by providing an overview of the resource management issues of the region and policies and methods to achieve integrated management of the natural and physical resources of the whole region”. The Wellington RPS is intended to provide a robust, integrated approach to promoting the sustainable management of natural and physical resources.

It is noted that a number of the policies within the RPS are written as directives to the relevant regional and district authorities.<sup>51</sup> Section 104(1)(b)(v) of the RMA requires consent assessments to have regard to the relevant provisions of an RPS.

#### 9.3.1 Air Quality

Objective 1 relating to Air Quality seeks that discharges of odour, smoke and dust to air do not adversely affect amenity values and people’s wellbeing. Objective 2 seeks that human health is protected from unacceptable levels of particulate matter.

If unmitigated, construction activities associated with the Project could give rise to adverse dust discharges. This has the potential to affect neighbouring residential amenity values, as well as present a safety issue for aircraft utilising the Airport. It is therefore necessary that this effect is appropriately managed. Mitigation in the form of various dust suppression methods is proposed and it is assessed that this will be effective in minimising any potential dust emissions to within 50m of the source. In

<sup>51</sup> Methods 1 and 2 of the RPS set out the implementation requirements in this regard. Policies 1 to 35 are therefore matters to be addressed by the relevant local authorities in reviewing and drafting relevant plans. Method 4 sets out that policies 35 to 60 will be implemented, where relevant, when considering a resource consent, notice of requirement or with regard to a plan change or variation to a regional or district plan.

addition, it is also recommended that continuous dust monitoring is undertaken for the duration of the project to ensure construction will not cause nuisance effects on residences, aircraft operations or recreational users of the area.

### 9.3.2 Coastal Environment

Objective 3 seeks to protect habitats and features in the coastal environment that have significant indigenous biodiversity values, and to protect from inappropriate subdivision, use and development habitats and features in the coastal environment that have recreational, cultural, historical or landscape values that are significant.

Objective 4 seeks that the natural character of the coastal environment is protected from the adverse effects of inappropriate subdivision, use and development. Policy 35 requires that particular regard shall be given to preserving the natural character of the coastal environment by:

- (a) *minimising any adverse effects from point source and non-point source discharges, so that aquatic ecosystem health is safeguarded;*
- (b) *protecting the values associated with estuaries and bays, beaches and dune systems, including the unique physical processes that occur within and between them from inappropriate subdivision, use and development, so that healthy ecosystems are maintained;*
- (c) *maintaining or enhancing amenity – such as, open space and scenic values – and opportunities for recreation and the enjoyment of the coast by the public;*
- (d) *minimising any significant adverse effects from use and enjoyment of the coast by the public;*
- (e) *safeguarding the life supporting capacity of coastal and marine ecosystems;*
- (f) *maintaining or enhancing biodiversity and the functioning of ecosystems;*  
*and*
- (g) *protecting scientific and geological features from inappropriate subdivision, use and development.*

Policy 36 requires that when considering a resource consent application a determination shall be made as to whether an activity may affect natural character in the coastal environment, and in determining whether an activity is inappropriate, particular regard shall be given to:

- (a) *the nature and intensity of the proposed activity including:*
  - (i) *the functional need or operational requirement to locate within the coastal environment*
  - (ii) *the opportunity to mitigate anticipated adverse effects of the activity*
- (b) *the degree to which the natural character will be modified, damaged or destroyed including:*
  - (i) *the duration and frequency of any effect, and/or*
  - (ii) *the magnitude or scale of any effect;*
  - (iii) *the irreversibility of adverse effects on natural character values;*

- (iv) *whether the activity will lead to cumulative adverse effects on the natural character of the site/area.*
- (c) *the resilience of the site or area to change;*
- (d) *the opportunities to remedy or mitigate previous damage to the natural character;*
- (e) *the existing land uses on the site.*

As discussed above, due to the existing locational constraints faced by Wellington Airport, any extension to the current runway will need to be into the CMA. From an engineering and environmental perspective achieving the runway extension via a reclamation to the south of the existing runway is considered the most feasible. The existing natural character values of the immediate area have been assessed as being moderate to low given the existing level of development in and around the Airport area. While the proposed extension will result in a change to the existing natural character this is not assessed as being significant, and can in part be mitigated through enhanced public access to the coast, and via the road, beach and ecological enhancements that are proposed to improve the existing coastal margin in the area.

The reclamation will result in the loss of approximately 11 ha of potential marine habitat, however none of the species or assemblages that are within the footprint are deemed to be rare or unique. It is also considered a minor loss in context of the level of existing modifications that have occurred in the past and the remaining Wellington south coast. Post construction, the rock dyke will provide new habitat and mitigation is proposed in order to encourage quicker recolonisation of species. There may be displacement during construction of birds, fish and marine mammals, however these effects will be temporary and are not considered to be significant, or adverse.

Discharges during construction of the reclamation have the potential to cause turbidity issues, however it is intended that these will be managed via appropriate erosion and sediment control measures and monitoring to prevent adverse effects on aquatic life, birds or fish species.

The proposed runway extension will affect surfing amenity within Lyall Bay. In order to mitigate this effect, a SWFS is proposed. Effects on other recreational values in and around the area (i.e. fishing, walking, etc) will be most pronounced during the construction phase of the Project, and while there may be some displacement these effects will be temporary and not considered to be significant.

In context of the level of existing development, the current Airport operational constraints and mitigation that is proposed as part of the overall Project, it is considered that the proposed runway extension is an appropriate use of the coastal environment in this particular location.

Objective 6 seeks to maintain or enhance the quality of coastal waters to a level that is suitable for the health and vitality of coastal and marine ecosystems. Policy 37 seeks that the life supporting capacity of coastal ecosystems are safeguarded. Policy 40 requires that particular regard shall be given to requiring that coastal water quality is managed as a minimum for the purposes of maintaining or enhancing aquatic ecosystem health, and for other purposes identified in the relevant regional plans.

An assessment of the effects of the Project on coastal water quality has been undertaken as to relevant objectives and policies in the NZCPS. The assessments undertaken have indicated that the proposed construction and reclamation activities will not give rise to adverse effects on water quality. Contamination due to disturbance of existing seabed sediments is not expected due to the high quality of the existing environment. Erosion and sediment control measures will seek to effectively limit any discharge of suspended sediments, and turbidity monitoring is proposed to confirm this. Ongoing stormwater discharges once the runway extension is established are expected to be minimal and will be collected and managed in a manner that is consistent with the current management regime at the Airport.

Objective 7 seeks that the integrity, functioning and resilience of physical and ecological processes in the coastal environment are protected from the adverse effects of inappropriate subdivision, use and development. An assessment of the proposed runway extension on coastal and ecological processes has been undertaken (refer **Technical Reports 15 – 19**). These assessments have concluded that although there will be some loss of habitat within the immediate footprint, and some changes to wave characteristics, the effects on all other coastal and ecological processes will be low or negligible.

As discussed above, the rock dyke will incorporate features that will enhance ecological habitat and speed up recolonisation post construction.

The coastal processes assessment describes that the cove to the east of the runway will exhibit a reduction in wave height as a result of the proposed runway extension. This is likely to create a more-enclosed basin in the area. Through the consultation process, concern was raised about the flushing of this area given the changes to wave dynamics, however it is assessed that the area will still be flushed given that it will still be exposed to refracting waves and southerly-wind directed currents into the cove.

Objective 8 seeks that public access to and along the CMA is enhanced. Policy 53 requires that particular regard shall be given to enhancing public access to and along the CMA with places, sites or areas that have:

- Historic heritage values;
- Are indigenous ecosystems and habitats;
- Hold significant biodiversity values; and
- Outstanding natural features or landscapes, is a special amenity landscape, or has high natural character.

The second part of the policy does however recognise that enhanced public access might not be acceptable in all circumstances, including where there is a need to protect indigenous habitats of species, the health and safety of people, sensitive cultural and historic heritage areas, and/or the integrity and security of regionally significant infrastructure.

The assessments have not found that the area affected by the reclamation is significant with regard to indigenous biodiversity values, natural character or landscape values.

Public access around the full perimeter of the proposed runway extension will be prevented due to Airport operational and safety requirements. However this will be offset by the provision of enhanced access and amenity in the areas of the coastal margin immediately adjacent to the extension and potentially limited access along part of the eastern edge of the reclamation. This includes a new shared pathway along Moa Point Road, a rock hopping type path along the eastern edge of the extension and ecological and beach enhancement for Moa Point Beach.

During construction, a temporary exclusion area will need to be established within the CMA. The purpose of this is to ensure public safety by preventing any potential conflicts with construction vessels and machinery.

### 9.3.3 Energy, Infrastructure and Waste

Objective 10 is that the social, economic, cultural and environmental, benefits of regionally significant infrastructure are recognised and protected. Relevantly, Policy 39 requires that particular regard shall be given to:

- (a) *The social, economic, cultural and environmental benefits of energy generated from renewable energy resources and/or regionally significant infrastructure;*

As noted earlier in this report, Wellington Airport is listed as being regionally significant infrastructure. The explanatory text recognises that one of the benefits of regionally significant infrastructure is the ability for people and goods to move efficiently and safely around, and to and from the region.

Wellington Airport is a significant physical resource for the region and nationally. It caters for over 5 million passengers per annum. It is also recognised as being a key contributor in providing for the economic growth and development of the city. The location of the Airport and its proximity to the CBD also creates significant efficiencies for passengers, particularly those on business related pursuits.

Significant investment has occurred to continue to develop the Airport to high standards in order to meet the needs of the modern traveller. Ongoing investment is proposed to achieve greater passenger and economic efficiencies and growth.

A number of independent studies since 2007 have all concluded that direct longhaul connections to and from Wellington are viable and will generate significant benefits for the Wellington region and the rest of New Zealand. The proposed runway extension seeks to realise this potential.

As discussed in Chapter 2, the proposed runway extension will improve economic efficiency and enhance access for individuals and businesses by:

- Enabling larger “wide bodied” aircraft with greater passenger and freight capacity to use the Airport at lower cost thus reducing the financial and opportunity cost of supplying and accessing airline services, particularly “long haul” services to



Asia and the USA that currently involve connecting flights either domestically or internationally;

- Lowering barriers to increased competition for airline services at Wellington Airport, thereby further increasing the efficiency with which airline services are supplied (eg. by allowing more efficient carriers operating more efficient wide bodied aircraft to offer more competitively priced airline services at the Airport); and
- Increasing the number of passengers and international aircraft using Wellington Airport (and altering the patterns of use of airline services at Wellington Airport) (refer **Technical Report 4**).

Overall it is considered that the economic and transportation benefits of the Airport now and in the future are significant locally, regionally and nationally. The proposed runway extension would facilitate further growth in international connectivity and economic development in Wellington and central New Zealand.

Policy 8 of the RPS is for district and regional plans to include policies and rules that protect regionally significant infrastructure from incompatible new subdivision, use and development occurring under, over or adjacent to the infrastructure.

Part of the existing Moa Point Sewage Treatment Plant ocean outfall passes through the area of the proposed reclamation. This pipeline comprises regionally significant infrastructure in accordance with the definition set out in the RPS<sup>52</sup>. Consultation with the treatment plant operator (Veolia) has been undertaken and provided suitable treatment to protect the pipeline is incorporated into the construction methodology it is understood that Veolia does not have any significant concerns with the construction methodology proposed. Consultation will continue and appropriate mitigation to ensure the pipe is protected as part of the construction of the Project will be set out within the NUMP as described in Chapter 8.

### 9.3.4 Historic Heritage

Objective 15 is that historic heritage be identified and protected from inappropriate modification, use and development. An assessment of known and potential archaeological and cultural sites has been undertaken (refer **Technical Report 22**). Given the level of modification that currently exists in the area there are no known sites that will be adversely affected by the Project. An accidental discovery protocol will however be in place throughout the construction period to manage any potential discoveries.

### 9.3.5 Indigenous Biodiversity and Landscapes

The objectives and policies<sup>53</sup> relating to indigenous biodiversity and landscapes relate to the management of areas of “significant indigenous biodiversity”, “outstanding natural features and landscapes” and “special amenity landscapes”. The area affected by the proposed extension is not assessed as being within any of these areas,

<sup>52</sup> The local authority wastewater and stormwater networks, systems and wastewater treatment systems.

<sup>53</sup> Objective 3 and Policies 24, 26 and 28.

therefore these provisions are not considered to be relevant to the consideration of these applications.

### 9.3.6 Natural Hazards

Objective 19 relates to the reduction of risks and consequences to people, communities, their businesses, property and infrastructure from natural hazards and climate change effects. Policy 51 requires that the risk and consequences of natural hazards on people, communities, their property and infrastructure shall be minimised, and/or in determining whether an activity is inappropriate, particular regard shall be given to matters which include:

- The frequency and magnitude of the range of natural hazards that may adversely affect the proposal or development, including residual risk;
- The potential for climate change and sea level rise to increase the frequency or magnitude of a hazard event;
- Whether the location of the development will foreseeably require hazard mitigation works in the future;
- The potential for injury or loss of life, social disruption and emergency management and civil defence implications – such as access routes to and from the site;
- Any risks and consequences beyond the development site;
- The impact of the proposed development on natural features that act as a buffer and where development should not interfere with their ability to reduce the risks of natural hazards;
- Avoiding inappropriate subdivision and development in areas at high risk from natural hazards;
- The potential needs for hazard adaptation and mitigation measures in moderate risk areas; and
- The need to locate habitable floor area and access routes above the 1:100 year flood level, in identified flood hazard areas.

As discussed earlier, a key mitigating factor in the management of natural hazards is the design criteria applied to the Project. The engineering design and material utilised will ensure that it is able to withstand a 2,500 year seismic event, and without catastrophic failure a 100 year wave event. Climate induced changes potentially arising over the next 100 years (sea level rise and waves) are not anticipated to endanger the current or proposed runway.

The extension is not considered to be an inappropriate development for the reasons discussed earlier in this Chapter.

### 9.3.7 Regional Form, Design and Function

Objective 22 is for a compact well designed and sustainable regional form that has an integrated, safe and responsive transport network, and:

- (a) *a viable and vibrant regional central business district in Wellington city;*
- (b) *an increased range and diversity of activities in and around the regionally significant centres to maintain vibrancy and vitality;*
- (c) *sufficient industrial-based employment locations or capacity to meet the region's needs;*
- (d) *development and/or management of the Regional Focus Areas identified in the Wellington Regional Strategy;*
- (e) *urban development in existing urban areas, or when beyond urban areas, development that reinforces the region's existing urban form;*
- (f) *strategically planned rural development;*
- (g) *a range of housing (including affordable housing);*
- (h) *integrated public open spaces;*
- (i) *integrated land use and transportation;*
- (j) *improved east-west transport linkages;*
- (k) *efficiently use existing infrastructure (including transport network infrastructure); and*
- (l) *essential social services to meet the region's needs.*

Policies 54 and 55 seek to have particular regard to achieving the region's urban design principles contained in Appendix 2 of the RPS, and maintaining a compact, well designed and sustainable regional form. Policy 57 seeks to integrate land use and transportation by having particular regard to the following when considering resource consent applications:

- (a) *Whether traffic generated by the proposed development can be accommodated within the existing traffic network and the impacts on the efficiency, reliability, or safety of the network;*
- (b) *Connectivity with, or provision of access to, public services or activities, key centres of employment activity or retail activity, open spaces or recreational activities;*
- (c) *Whether there is good access to the strategic public transport network;*
- (d) *Provision of safe and attractive environments for walking and cycling; and*
- (e) *Whether new, or upgrades to existing, transport network infrastructure have been appropriately recognised and provided for.*

The Airport is influential within the city's urban form. The Airport is conveniently close to the city's centre and the catchment of both business people and residents using it. The Airport's position has long influenced decisions on the city form and growth. This influence includes planning of transport infrastructure and the way in which land uses have transitioned around the Airport with buffers to the east (golf course) and the interface with residential properties to the west (Bridge Street). The decision to retain the Airport in the current location is one that has been cemented each time it has been considered. The convenience it represents to the city as a compact form is significant,

providing quick and easy access to the city centre and the user catchment. Continuing to develop the Airport, and as part of this the proposed runway extension, is consistent with the planned urban form of the city and its projected growth in nodal centres (at Kilbirnie) and transportation network. An extension to the current runway is considered to be an efficient use of the existing infrastructure.

The Airport in its current location is an integral part of the growth plan for Wellington and this is recognised in a number of regional and district strategic documents. Objective 22 of the RPS refers to the development and/or management of the Regional Focus Areas as specified in the WRS 2007. The Johnsonville to Airport – Growth Spine is identified as one of these “Focus Areas”. The strategy describes this area as being *“critical because it contains a number of key regional facilities including the port, airport, regional hospital and Wellington CBD. Increasing pressure on road, rail and bus transport is resulting from business and apartment growth within the CBD. Planning needs to accommodate further growth pressures, recognising that this area is the economic engine room of the regional economy”*.

The open space values of the Lyall Bay side of the proposed runway extension are proposed to be enhanced through the addition of improved walking access and connections to the Lyall Bay Parade. The development of a shared (walking and cycling) pathway along Moa Point Road alongside the western straight sided edge to the Airport on the west side is intended to enhance the open space experience of Lyall Bay. Improvements to the Moa Point beach area are also proposed to enhance this open space area.

There are no feasible options to construct the proposed runway extension to form a natural coastal edge as this would require additional coastal areas to be reclaimed to generate the natural slope of the land into the sea.

The construction of the Project (assuming land based fill is required) will generate a number of heavy vehicle movements to and from the fill sources (quarries) to the construction site. An assessment of the existing transportation network has concluded that with the appropriate traffic management, delivery sequencing and mitigation in place the existing road network can provide safe and convenient access to and from the proposed construction site.

Whether the proposed runway extension will have any significant effect on vehicle trip numbers to and from the Airport has also been considered. A comparative analysis has been undertaken by TDG, comparing busy hour vehicle trip forecasts arising from the likely passenger numbers generated under a BAU (ie. no extension) scenario vs the proposed runway extension scenario out to the year 2045. This analysis has found that with the runway extension in place the increase in vehicle traffic generated by the runway extension is only marginally higher than the BAU option, averaging at 0.2% per annum, with a 2 -3% total increase overall to 2045. This is not considered to be significant and will not increase any unforeseen pressure or issue with the transportation network in and around the Airport.

### 9.3.8 Resource Management with Tangata Whenua

Objective 24 requires that the principles of the Treaty of Waitangi are taken into account in a systematic way when resource management decisions are made.

Objective 25 relates to the concept of kaitiakitanga in that it is integrated into the sustainable management of Wellington region's natural and physical resources. Objective 26 is that the mauri of coastal and fresh waters is sustained. Objective 27 seeks that mahinga kai and natural resources used for customary purposes, are maintained and enhanced, and these resources are healthy and accessible to tangata whenua. Objective 28 seeks that the cultural relationship of Maori with their ancestral lands, water, sites, wahi tapu and other taonga is maintained.

These objectives are supported by Policy 49 which recognises the importance of these matters of significance to tangata whenua.

Efforts have been made by WIAL through consultation, the preparation of a cultural values report and CIAs to understand and provide for the Maori values of the area and natural resources. This work has confirmed that there are no cultural or archaeological sites of significance that will be directly affected by the Project. It is acknowledged that water is viewed as taonga to Maori. It sustains life and is central to wellbeing. It is appreciated that the mauri of water resource can be compromised through the loss of habitat, discharges and contamination in particular. Maintaining an appropriate level of water quality in the CMA during the construction of the proposed runway extension and mitigating the effects of habitat loss through the proposed ecological enhancements has a commensurate mitigating effect on cultural values. Consultation with iwi will be ongoing and input into the development of key management plans, such as the EMMP will also be sought.

### 9.3.9 Soils and Minerals

These matters are relevant as they relate to the management of earthwork activities. Policy 41 requires that particular regard shall be given to controlling earthworks and vegetation disturbance to minimise erosion and silt and sediment runoff into water, or onto land that may enter water, so that healthy aquatic ecosystems are sustained. As described above appropriate erosion and sediment control measures will be employed throughout the duration of the construction phase to ensure that the adverse effects from sediment discharges are suitably mitigated.

## 9.4 OPERATIVE REGIONAL PLANS

### 9.4.1 Wellington Regional Coastal Plan

*General Objectives and Policies*

Objective 4.1.1 seeks that the intrinsic values of the CMA and its components are preserved and protected from inappropriate use and development. Objective 4.1.2 seeks that people and communities are able to undertake appropriate uses and developments in the CMA which satisfy the environmentally focussed policies in the plan, including activities which:

- Rely on natural and physical resources of the CMA; or

- Require a CMA location; or
- Provide essential public services; or
- Avoid adverse effects on the environment; or
- Have minor adverse effects on the environment, either singly or in combination with other users; or
- Remedy or mitigate adverse effects on the environment and provide a net benefit to the environment.

As described above, the proposed runway extension is considered to be an appropriate use of the CMA in this particular location due to the significant investment in existing infrastructure. To enable long haul flights to and from Wellington Airport, an extension of the runway is required. Given that the Airport is currently constrained at either end of the runway by the CMA, an extension into the CMA is the only practicable method of providing for the proposed runway extension. Measures to avoid, remedy or mitigate adverse effects on the environment have been built into the proposal design. Engineering measures will ensure coastal hazard risk is appropriately avoided or mitigated<sup>54</sup>, and environmental measures such as ecological enhancement and amenity features will assist in mitigating the adverse effects arising from the use of a portion of the CMA for the reclamation. The area surrounding the proposed runway extension is already modified and although there will be adverse visual effects from immediate vantage points, the overall form of the extension will fit and be seen in the context of the existing Airport environs. Mitigation to improve the overall amenity value along Moa Point Road and the Moa Point beach is also proposed to reduce the impact of the effect of the proposed runway extension on visual and amenity values in the area, post construction.

Objective 4.1.4 seeks that land, water and air in the CMA retains its life supporting capacity. As discussed above, although a portion of the CMA and habitat for certain species will be lost as a result of the proposed runway extension this is not considered to be significant. The overall loss of habitat is small in comparison to the availability of the same or similar habitat elsewhere on the south coast, and post construction of a new rock/reef structure will be established. No significant or important ecosystems or species will be lost as a result of the proposed runway extension into the CMA<sup>55</sup>. It is noted that a red algae has been found within the footprint of the proposed reclamation, and although this has not been recorded as being found elsewhere in the Wellington region, it has been found elsewhere in New Zealand and it is likely that it is more widespread indicating that it is not particularly rare or significant. However as noted above, if it is found it is recommended that this species is translocated.

Features will be incorporated into the design of the structure to also enhance recolonisation for aquatic species.

Construction activities in the CMA could give rise to adverse effects on water quality. This will be appropriately managed through the use of erosion and sediment control devices and adherence to prescribed water quality limits in the receiving waters. It is

<sup>54</sup> Objectives 4.1.11 and 4.1.12.

<sup>55</sup> Objective 4.1.6.



not expected that the temporary construction effects will have any long term adverse effects on the life supporting capacity of the CMA surrounding the Project.

Objective 4.1.5 seeks that the natural character of the CMA is preserved and protected from inappropriate use and development. An assessment of the effects of the proposed runway extension on natural character has been undertaken (refer **Technical Report 25**). The findings of this assessment have been discussed above with regard to the NZCPS and Policy 13 in particular. It is not considered that the proposed runway extension is an inappropriate use and development of this area of the CMA.

Objectives 4.1.7 – 4.1.9 seek that public health is not endangered by activities in the CMA, and that public access and amenity values are maintained and enhanced. During construction of the reclamation, public access to and around the construction site will need to be restricted due to public health and safety reasons. Once the extension is in place public access within the surrounding CMA will be restored, and although public access around the edge of the proposed runway extension will need to be restricted on a permanent basis due to potential conflicts with Airport operations and safety, it is proposed that access to the CMA in other areas will be improved (ie. Moa Point Beach). Amenity values within the CMA will also be temporally affected during construction due to the presence of, and increased noise from, construction machinery and vessels.

Objectives 4.1.13 to 4.1.17 relate to the management of tangata whenua interests in the CMA. As discussed above the cultural significance of the CMA to tangata whenua has been recognised through the consultation undertaken with relevant iwi representatives, preparation of a cultural issues report, and further involvement with Iwi as the Project progresses.

Supporting Policy 4.2.1 seeks to recognise that the intrinsic values of the CMA and its components are the heritage of future generations and are worthy of protection in their own right, while allowing for appropriate use and development. Policy 4.2.2 seeks to recognise and distinguish between those parts of the CMA which retain natural character, and those areas where natural character has already been compromised, and to encourage appropriate new developments only in the latter areas. As discussed above, the proposed runway extension is considered to be an appropriate use and development of this area of the CMA, when natural character has already been compromised by the Airport and other surrounding developments. As far as practicable adverse effects on the values within the CMA, such as ecology, water quality and recreational values are able to be mitigated, and the area is already characterised by a high degree of modification.

When considering the significance of adverse effects on the CMA, Policy 4.2.3 is to recognise and distinguish between activities that require occupancy on a permanent basis, and have irreversible or long term adverse effects, and those that do not. Due to the locational constraint an extension to the runway is only feasible by reclamation into the CMA. While this will result in the loss of a portion of the CMA, it is noted that this area is not significant in terms of habitat, biodiversity or natural character values, and is adjacent to an area that is already highly modified. The proposed reclamation will not have a significant impact on coastal processes within the surrounding area,

and while there will be a change to the wave heights and the loss of a recreational surfing amenity (Airport Rights), these effects are proposed to be mitigated via the SWFS as described in Chapters 4 and 7<sup>56</sup>. The location of the structure will also be optimised to ensure that it does not generate a significant adverse effect on coastal processes such as shoreline erosion or accretion along the Lyall Bay foreshore.

Policy 4.2.5 requires that the precautionary approach to resource management decisions in the CMA is applied, particularly in those situations where it is difficult to predict adverse effects with any certainty. It is considered that the effects of the proposed reclamation and associated activities have been thoroughly investigated and are understood. Where further or additional monitoring is required, this will be guided by the preparation and implementation of appropriate management plans. The preparation of the number of these plans is intended to involve stakeholder engagement prior to settling on final monitoring and reporting obligations.

Policy 4.2.6 recognises the importance of the CMA as a place for the safe and convenient navigation of ships and aircraft and to protect these from inappropriate use and development. As described in Chapter 4 the Airport's OLS controls impose constraints on the methods that can be employed in the construction of the reclamation. The options to manage this are described in Chapter 4. Construction may require working outside operational times of the Airport which necessitates night time construction activities. Recreational and commercial vessels will be excluded from the site during the construction phase. Post construction the extension will have no effects on the ability to navigate vessels in and around the area.

Policies 4.2.10 – 4.2.12 seek to protect sensitive, rare or unusual habitats, natural or physical resources or ecosystems, and to protect cultural and historic features in the CMA from the adverse effects of use and development. The proposed extension will not adversely affect sensitive, rare or unusual habitats, natural or physical resources or ecosystems, nor will it adversely affect habitats or features which are of significant importance for traditional, cultural or heritage purposes<sup>57</sup>.

Policies 4.2.15 – 4.2.18 relate to public access and seek to maintain an existing level of access where practicable and to support initiatives which might give rise to enhanced public access opportunities. As discussed above the proposal is considered to be consistent with these policies, only restricting public access where it is necessary to do so for public health and safety reasons and to prevent any conflict with Airport operations. Public access and amenity in and around the Moa Point Road and the Moa Point beach will be provided for as far as is practicable post construction.

Policies 4.2.19 and 4.2.20 seek to recognise the importance of amenity and recreational values in the CMA, and to avoid where practicable any adverse effects on these values and where this is not possible to remedy or mitigate these values. As discussed above, during construction of the proposed runway extension amenity values of the CMA will be adversely affected through the presence of construction machinery and vessels and associated increased noise and access restrictions. These effects will be most significant for those who live within the immediate area. Measures

<sup>56</sup> Also consistent with Policy 4.2.8.

<sup>57</sup> Policies 4.2.10 – 4.2.12.

to mitigate these effects include the offer from WIAL to purchase properties along Moa Point Road, or to develop appropriate property based mitigation methods in consultation and agreement with the affected owners such as acoustic insulation and/or temporary rehoming during particularly noisy construction periods. Recreational activities within the CMA (such as fishing or diving) will also be temporarily displaced within the exclusion zone during the construction period. This is necessary to protect public safety. The proposed runway extension will likely result in some changes to the existing surfing amenity within Lyall Bay and the loss of the Airport Right's surf spot. These effects are unavoidable, however it is proposed that they be mitigated by the construction of the SWFS as described earlier.

Policy 4.2.33 seeks that resource consents explicitly identify the occupancy component which requires occupation of land of the Crown and related CMA. The temporary and permanent occupation requirements have been described in Chapter 1 of this report.

Policies 4.2.35 to 4.2.37 relate to the type of conditions that might be imposed on any permits granted within the CMA. These matters have all been taken into account when developing the proposed conditions (Section 8.5).

#### **9.4.2 Reclamation**

The objectives and policies in section 5 of the Coastal Plan are directly relevant to reclamation activities. Objective 5.1.1 seeks that the area of foreshore and seabed reclaimed from the CMA is minimised, and Objective 5.1.2 requires that all reclamations are fully justified having regard to available alternatives, that they are properly designed, use appropriate materials and are constructed only for activities consistent with the sustainable management of natural and physical resources. As discussed above with regard to Policy 10 of the NZCPS, it is considered that the proposed reclamation is necessary in order to provide for an extension of the runway at Wellington Airport. There are no practicable alternatives to reclamation, and an extension to the south is considered to be the most feasible from an engineering, environmental and cost perspective. The proposed runway extension which is enabled by the reclamation will also give rise to significant regional and national benefits by enabling increased accessibility and efficient operation of Wellington Airport, and is consistent with a number of strategic national, regional and city documents and policies. The reclamation will not adversely affect any significant natural, cultural or biophysical values and where practicable mitigation or remediation has been proposed. Overall it is assessed that the reclamation is appropriate, and is consistent with achieving the sustainable management of natural and physical resources.

Objective 5.1.4 requires that all proposals for reclamations, other than minor ones, are subject to input from the public and territorial authorities. As described in Chapter 6 WIAL has consulted with a number of key stakeholders, agencies, relevant regulatory authorities and directly affected landowners, prior to filing the application. WIAL has also embarked on an extensive public consultation process involving the widespread dissemination of information and opportunity for people to provide feedback via various means, the holding of open days and individual meetings. Feedback was invited and a summary of the issues and responses is provided in Chapter 6. Wherever possible the technical reporters and WIAL has endeavoured to address the feedback received

in the various assessment reports and in proffering conditions of consent. It is expected that the resource consent applications will be publicly notified.

Policy 5.2.1 seeks to recognise that all reclamation activities will have adverse effects, and that these effects, and the extent to which they can be mitigated or remedied must be balanced against any possible positive effects from the reclamation. As described above, the reclamation will have an unavoidable effect on the habitat directly beneath it, however the area is already highly modified and is not considered to be significant for any ecological or biological purposes and its loss will be mitigated through the ecological enhancement measures that are proposed. Potential adverse effects on surfing amenity will also be mitigated. Visual effects arising from the extension will be most significant on those living within the immediate area. These effects are unavoidable and can only be partially mitigated. However in terms of the Policy these effects are able to be balanced against the positive effects that are likely to arise from the reclamation which includes enhanced accessibility for the region through the proposed runway extension with attendant economic benefits. As described in the CBA Report (**Technical Report 4**) these anticipated benefits for the region are likely to be significant.

Policy 5.2.3 seeks to not allow reclamations if there are practical alternatives, either within or outside the CMA which, on balance have less significant adverse effects on the environment. Notably the subsequent policy<sup>58</sup> is (subject to Policy 5.2.3) to only allow reclamation if it is required for (among other reasons) airport purposes.

An assessment of alternatives has been undertaken in Chapter 5.

Policy 5.2.5 seeks to preclude reclamations which will have significant adverse effects on values of significant conservation areas, reefs or significant habitats or ecosystems. The ecological assessments have not identified any significant adverse effects arising from the proposed reclamation nor values that are so significant as to warrant avoidance. These assessments conclude that the area is already significantly modified and the loss of reef habitat will be mitigated by the features within the rock dyke that will seek to encourage recolonisation of species post construction.

Policy 5.2.6 requires that the reclamation is no larger than the minimum necessary to provide for the activity for which the reclamation is proposed to be used. Policy 5.2.7 seeks to ensure that the external appearance of the reclamation has regard to the existing character of the area, and is designed to minimise adverse effects on ecological and physical processes. As discussed above, the form of the reclamation is consistent with the existing Airport runway and is necessarily linear in shape. The length of the runway is considered to be the minimum necessary to enable its use by Code E aircraft, with a 90m RESA consistent with CAA requirements. Although it will result in a change in natural character to the immediate area this is not assessed as being significant and will be viewed in context of the existing Airport activities.

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<sup>58</sup> Policy 5.2.4.

The design parameters for the reclamation are key features in mitigating or preventing adverse effects arising from potential coastal hazards or other natural hazard events (i.e. seismic activity)<sup>59</sup>.

In terms of Policy 5.2.10, it has been explained earlier why it is necessary to restrict public access around the full perimeter of the proposed runway extension, during and after the construction process.

### 9.4.3 Structures

The toe of the reclamation which will remain below mean high water springs has been assessed as a structure in terms of the Coastal Plan. Construction activities will also likely require the establishment of temporary structures such as moorings. The wave focusing structure is also a structure that needs to be assessed with regard to relevant objectives and policies.

Objective 6.1.1 seeks to allow appropriate structures which enable people and communities to provide for their economic and social wellbeing. Supporting Policy 6.2.1 sets out that appropriate structures are associated with:

- Activities which are functionally dependent upon a location in the CMA; or
- Activities which support and service those which must locate in the CMA, and which, because of a lack of suitable space or operational constraints, cannot be located outside of the CMA.

It is considered that the structures associated with the construction, operation and mitigation of the proposed runway extension are appropriate in context of Policy 6.2.1.

Policy 6.2.2 is to not allow structures in the CMA where there will be adverse effects on specified conservation or cultural values, or where there will be significant adverse effects on:

- The risk from natural hazards;
- Navigation channels;
- Coastal processes, including waves, tidal currents and sediment transport;
- Amenity values;
- Existing lawful public access;
- Natural character;
- Views to and from the CMA;
- Recreational uses; or
- Structures of architectural or historic merit;

unless such adverse effects can be satisfactorily mitigated or remedied.

<sup>59</sup> Therefore consistent with Policy 5.2.8.

As noted above, the adverse effects arising from temporary structures are not considered to be significant. Effects arising from permanent structures such as the toe of the rock dyke are not assessed as being significant and mitigation with regard to effects on ecological values is to be incorporated into the design of the structure.

The SWFS is proposed to mitigate or offset the effects of the reclamation on surfing amenity within Lyall Bay. A study of ecological values within wider Lyall Bay (refer **Technical Report 20**) has not identified any significant features or assemblages that will be adversely affected by the placement of this structure. The positioning and design of the structure will also be managed to avoid any potential effects on recreational safety.

The effects of the structure on coastal processes, namely its effect on the Lyall Bay shoreline has also been investigated (refer to **Technical Assessment 14**). This study has found that the structure could alter the existing erosional and accretion rates along the shoreline. However it is noted that the SWFS reorganises the mean position of the shoreline such that the recession in the lee of the structure is compensated by accretion elsewhere on the beach. Thus, the structure may be placed such that the reorganisation of the shoreline due to the presence of the structure is a benefit for the management of the shoreline by causing accretion in a vulnerable location at the expense of recession in a location that is less vulnerable. Such an optimisation is considered to be possible and is recommended as part of the detailed design which will be undertaken in accordance with the SMAMP.

The permanent structures associated with the proposed runway extension will be designed so as to minimise any potential coastal hazard risk<sup>60</sup>.

Policy 6.2.6 relates to the management of lighting on structures within the CMA and seeks that it is directed away from adjacent activities, streets and navigational channels. Temporary lighting within the CMA may be required during the construction of the proposed runway extension, this will be managed so that it is directed toward the area of work to avoid unnecessary light spillage. Lighting requirements post construction of the proposed runway extension will be in accordance with CAA requirements for runway and aircraft safety.

Policy 6.2.7 requires that structures within the CMA which are accessible are adequately maintained so that the structure remains safe and any adverse effects on the visual amenity of the area are minimised. The design of the proposed runway extension is such that it is suitable for the environment in which it is to be located. This will ensure that the integrity of the structure is maintained in the long term. The wave focussing structure will also be made from material that is able to withstand foreseeable coastal processes, and will be inspected periodically and maintained if necessary.

The structures that are proposed to either provide for the construction, operation and/or mitigation of the proposed runway extension are all assessed as being appropriate.

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<sup>60</sup> Policy 6.2.5.



Appropriate provision has been made to ensure that the OLS and aircraft operations will not be adversely affected during the construction of the proposed runway extension<sup>61</sup>.

#### 9.4.4 Deposition of Substances on the Foreshore or Seabed

This section is particularly relevant with regard to the beach nourishment and ecological enhancements that are proposed to be undertaken along the eastern part of the Moa Point beach area. This work will be designed and implemented via the LUDMP in consultation with key landowners, Iwi, stakeholders and the affected community as appropriate (i.e. Moa Point residents). The proposed beach enhancement features will be designed so as to ensure consistency with the relevant objectives and policies of Section 8 of the Coastal Plan which seek to improve the amenity value of beaches, provided that all of the following criteria can be met:

- The composition of the material is suitable for the site, will remain on the foreshore or seabed for a reasonable period of time, and will not result in increased water turbidity or wind borne sediment transport;
- The deposition will not adversely affect the amenity value of the foreshore or seabed through significant changes in beach slope or texture; and
- The deposition will not cause any significant adverse effects on marine fauna, or flora, or human values or uses of the area.

#### 9.4.5 Discharges to Land and Water

Objective 10.1.1 seeks that high quality water in the CMA is protected and not degraded through human activities. Objective 10.1.3 seeks that water quality in the CMA is, as far as practicable consistent with the values of the tangata whenua.

Supporting Policies 10.2.1 and 10.2.2 sets out the areas where water quality will be managed for shellfish gathering and/or contact recreation purposes. As identified above, the majority of the coastal water surrounding the Airport is to be managed in order to maintain a suitable quality for contact recreation purposes. To the east of the proposed runway extension an area is identified as being of a quality suitable for shellfish gathering and consumption. Policy 10.2.3 sets out that particular regard shall be had to the water quality criteria set out in Appendix 6 of the Coastal Plan when considering applications for resource consents in order to determine if the discharge is able to comply with Policies 10.2.1 and 10.2.2. Appendix 6 sets out the minimum criteria that must be achieved following reasonable mixing of any discharge in the areas specified.

As discussed above, water quality adjacent to the Airport is reasonably high, and if not appropriately controlled discharges from the construction of the proposed runway extension could give rise to adverse effects on water quality. To minimise this potential effect, erosion and sediment control devices and other measures will be incorporated into the construction methodology and implemented via the ESCP. Compliance with specified turbidity limits is proposed.

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<sup>61</sup> Policy 6.2.10.

As noted above an exclusion zone around the construction site will be established. For safety reasons this will prevent public access so contact recreation and shellfish gathering will not be allowed within approximately 300m of the site for the duration of the construction programme.

While it is not anticipated that any undue adverse effects will arise during the construction of the proposed runway extension with regard to discharges and surrounding water quality, it is noted that these discharges and any potential effects will be temporary. Policy 10.2.4 specifically exempts discharges from having to comply with the water quality standards specified in the Plan if the discharge is of a temporary nature, or associated with maintenance works, or there are exceptional circumstances and that it is consistent with the Act to do so.

Operationally the discharges from the proposed runway extension will be minimal and limited to stormwater, or limited amounts of sediment discharges should any maintenance work on the extension be required.

#### **9.4.6 Discharges to Air**

Objectives and policies relating to discharges to air seek that activities which result in discharges of contaminants to air are allowed where there are no significant adverse effects on existing ambient or local air quality<sup>62</sup>. Discharges to air within the CMA arising from construction activities are expected to be minimal. However, due to the potentially sensitive nature of the receiving environment, i.e. overflying aircraft and neighbouring residential properties, all necessary controls to properly manage any potential adverse effects from dust discharges will be imposed including continuous TSP monitoring and trigger levels to initiate mitigation measures. The proposed conditions of consent set out the proposed methods in this regard.

#### **9.4.7 Surface Water and Foreshore Activities**

As discussed above, during construction an exclusion zone of approximately 300m around the construction site will be required. This will extend out into the CMA and effectively act as a temporary occupation of the area shown in Figure 1-6 for the duration of the construction programme. The intent of this temporary exclusion zone is consistent with Objective 13.1.3 which seeks to minimise the conflict between activities and users of the CMA.

#### **9.4.8 Wellington Regional Air Quality Management Plan**

Objective 4.1.1 aims to maintain and protect high quality air in the region, enhance degraded air quality, and ensure there is no significant deterioration in ambient air quality. Objective 4.1.2 aims to manage (avoid, remedy or mitigate) adverse effects from air discharges. Relevant policies provide direction on the analysis of effects, sensitive environments, and the adoption of best practice (ie. minimise discharges at source).

<sup>62</sup> Objective 11.1.2 and Policy 11.2.2.

Construction activities could give rise to potentially adverse dust discharges without mitigation. An evaluation of the potential impact of these discharges and recommendations for the appropriate mitigation and monitoring has been undertaken (refer **Technical Report 21**). Based on this assessment it is considered that with the appropriate mitigation in place, the potential for dust discharges arising from the construction site will be minimal and confined to within 50m of the source. It is not expected that air quality will be adversely affected as a result of this proposal.

Policy 4.2.22 relates to the effects of discharges from mobile transport sources and seeks to avoid, remedy or mitigate such effects. Air emissions from aircraft post construction of the proposed runway extension are not expected to be significantly different from what would occur under a normal growth rate of the Airport. It is also noted that the AQMP has sought to apply a non-regulatory approach to the management of air discharges from mobile transport sources. This is on the basis that any regulations or minimum standards are better to be developed and applied at a national level, noting that a national approach ensures equity and consistency across regions.

#### **9.4.9 Wellington Regional Soil Plan 2000 and Wellington Regional Discharges to Land Plan 1999**

The Regional Soil Plan is relevant insofar as earthworks and land disturbance associated with the construction of the proposed runway extension above mean high water springs is likely to be required (for example removal of the hillock). Objectives 4.18 to 4.1.11 promote avoiding, remedying and mitigating the effects of vegetation clearance and earthworks. Earthworks and land disturbance will be undertaken in such a manner so as to avoid, remedy or mitigate any potential adverse effects. Potential erosion and sediment discharges arising from the earthworks and land disturbance will be managed in accordance with the ESCP. These measures will ensure consistency with Policies 4.2.15 and 4.2.16 of the Regional Soil Plan and also the relevant objectives and policies within the Regional Discharges to Land Plan.

The terrestrial vegetation values within the footprint of the Construction Site are not considered to be significant, and post construction beach nourishment including planting with appropriate species is proposed. This will be undertaken in accordance with the LUDMP with input from key stakeholders, Iwi and the surrounding community.

### **9.5 PROPOSED REGIONAL PLAN**

As outlined in Chapter 1 of this report in 2015 Greater Wellington notified its Proposed Natural Resources Plan. At the time of writing this application, Greater Wellington has notified a summary of decisions requested on the Proposed Plan, with further submissions closing on 23 March 2016. Given that hearings and decisions on the Proposed Plan are still some time away, it is considered that greater weight in regard to this evaluation should be placed on the operative regional plans. Notwithstanding this, an assessment of the proposal against the objectives and policies of the Proposed Plan has been undertaken as it has legal effect upon notification, and though they may be subject to further development, the objectives and policies of the Proposed Plan provide the present policy framework to support those rules.

### 9.5.1 Objectives and Policies

The objectives in section 3.1 recognise the connectedness of natural resources or ki uta ki tai: mountains to the sea<sup>63</sup>. Objective O2 recognises the importance and contribution of land and water to the social, economic and cultural wellbeing of the community.

Objective O3 seeks that mauri is sustained and enhanced, particularly the mauri of coastal waters.

WIAL recognises the significance of the connection between tangata whenua and the coastal environment through its consultation with iwi, the cultural values report and the CIAs that have been prepared with respect to this Project. The ‘mauri’ of the CMA could be adversely affected through the loss of habitat, and by potential discharges and disturbances during construction affecting coastal water quality. As outlined in the draft CIAs iwi are supportive of the measures recommended to assist in managing the potential for these adverse effects and are satisfied that with such measures in place adverse effects on mauri will be suitably mitigated. Iwi also recognise the significant economic benefits that could be derived from the extended runway.

Objectives O4 and O5 seek that the intrinsic values of marine ecosystems and the life supporting capacity of water are recognised, and that the CMA, as a minimum is managed to:

- Safeguard aquatic ecosystem health and mahinga kai, and
- Provide for contact recreation and Maori customary use.

In terms of water quality, outside the zone of reasonable mixing, the assessments have not identified that there will be any adverse effects on the intrinsic values or life supporting capacity of aquatic ecosystems or mahinga kai, or the ability to use the CMA for contact recreation or customary purposes. The reclamation will result in some loss of habitat (subtidal reef systems), however the habitat and assemblages affected are not considered to be significant or rare. The loss of habitat will also be mitigated by the gain in coastline bordered by subtidal reef that will occur as result of the proposed rock dyke, and further by the design and construction of the rock wall to encourage recolonisation of species.

Section 3.2 relates to beneficial use and development of the region’s natural and physical resources. Relevant objectives seek to maintain and enhance recreational values and public access to the CMA<sup>64</sup>. Supporting Policy P9 aims to avoid a reduction in public access along the CMA, unless it is necessary to protect public health and safety or to provide for a temporary activity. Where public access is to be restricted for these reasons, this effect is required to be mitigated or offset by providing enhanced public access at a similar or nearby location.

As discussed above, while there may be some temporary displacement or disturbance in the immediate area during the construction of the runway extension, mitigation is proposed to enhance public access in and around the wider Lyall Bay and Moa Point

<sup>63</sup> Objective O1.

<sup>64</sup> Objectives O9 and O10.

areas in the longer term. Access to the CMA around the full perimeter of the proposed extension will not be permitted due to public health and safety and aircraft considerations, however a rock hopping type path is proposed along the eastern edge of the extension.

Objective O12 seeks that the social, economic, cultural and environmental benefits of regionally significant infrastructure are recognised, and that the use and ongoing operation of regionally significant infrastructure in the CMA are protected from new incompatible use and development occurring under, over or adjacent to the infrastructure or activity. Policy P12 seeks that the benefits of regionally significant infrastructure are recognised, by among other matters having regard to operational requirements<sup>65</sup> associated with developing, operating, maintaining, and upgrading such infrastructure. Policy P13 further recognises that the use, operation, maintenance and upgrading of existing regionally significant infrastructure are beneficial and generally appropriate.

Wellington Airport is recognised as being infrastructure that is of regional significance. In this regard it is appropriate to recognise that by enabling the extension of the runway significant benefits will accrue, such as increased accessibility, and in turn increased tourism and economic activity.

Part of the existing Moa Point Sewage Treatment Plant ocean outfall passes through the area of the proposed reclamation. Engineered protection of the outfall pipe to avoid damage due to placement of the dyke and reclamation fill is also therefore proposed. The appropriate measures to ensure that the pipe is sufficiently protected will be incorporated into the construction methodology and this will be worked through in agreement with the utility operator (Veolia) in accordance with the NUMP and proposed conditions.

Objectives in section 3.3 seek to recognise Maori relationships with natural resources within the region. The Project is consistent with the outcomes intended by these objectives in that the cultural significance and values of the area affected are well understood, and appropriate mitigation is proposed in order to protect these existing values. Ongoing consultation and involvement of iwi in the preparation of mitigation and management plans is also proposed.

Section 3.4 relates to natural character, form and function. Objective O17 is that the natural character of the CMA is preserved and protected from inappropriate use and development. Policies P24 and P25 are similar in intent to Policy 13 of the NZCPS.

As discussed above, the proposal is not an inappropriate use and development of the CMA, nor will it affect an area that is identified as being of outstanding natural character. The effects on natural character arising as a result of this proposal are not significant or adverse and can in part be mitigated through the urban design and landscape treatments that are proposed in and around the surrounding Moa Point Road and beach areas.

<sup>65</sup> Operational requirement is defined as “when an activity needs to be carried out in a particular location or way in order to be able to function effectively or efficiently.”

Objective O19 seeks that the interference from use and development on natural processes is minimised. Policy P26 aims to minimise effects on the integrity and functioning of natural processes.

In considering the effects of the proposal on natural coastal processes it should be noted that the proposed runway extension is located within a highly modified environment that has already been considerably impacted by existing development and past reclamations. The placement of the Airport, the sea wall and car parks and roading along Lyall Bay have also already affected the natural coastal and beach processes in the area (ie. wave generation around the sea wall and reclamation and fixing of the Lyall Bay Beach shoreline).

Notwithstanding this the proposed runway extension will result in further modifications to the area. The effects of the extension on coastal processes has been undertaken by NIWA and DHI (refer **Technical Report 15 and 11**). These assessments have found that, aside from a reduction in the wave climate in Lyall Bay, the extension will have minimal or negligible effects on coastal processes in the area.

There will likely be a reduction in wave heights within Lyall Bay, and the extension will result in the loss of the surfing spot “Airport Rights”. While these effects are not considered significant from coastal processes, or morphological perspective, it is acknowledged that this would have an adverse effect on surfing amenity within the area. As described earlier this effect is to be mitigated by the proposed wave focussing structure. Other effects on coastal processes arising from the extension and the wave focusing structure are not expected to be adverse.

Other relevant objectives and policies relate to the management of coastal hazard risk. As outlined above, a key element of the design of the extension is to minimise any such risk. The finished ground level of the runway will also be of a sufficient height to mitigate any potential effects from climate change and sea level rise.

Section 3.5 relates to water quality. Objectives seek to maintain or improve water quality in the CMA and to ensure it achieves certain management purposes including that it is suitable for contact recreation and the gathering of shellfish. An assessment of these matters has been undertaken above, and it is considered that with the appropriate mitigation in place adverse effects on water quality will not arise outside a zone of reasonable mixing.

Objective O25 seeks that aquatic ecosystem health and mahinga kai in the CMA is safeguarded through maintaining water quality, restoring health and achieving objectives for habitats that are set out in the plan. Policy P32 seeks to manage significant adverse effects on aquatic ecosystem health and mahinga kai via the following hierarchy:

- Avoiding significant adverse effects; and
- Where significant adverse effects cannot be avoided, remedying them; and
- Where significant adverse effects cannot be remedied, mitigating them; and



- Where residual adverse effects remain, it is appropriate to consider the use of biodiversity offsets.

As discussed above, although there will be some loss of habitat arising from the proposed runway extension, the effects on overall aquatic ecosystem health and water quality is not considered to be significant. Mitigation is also proposed to further ensure that this is the case.

Section 3.7 is specific to sites with significant values. With regard to values within Lyall Bay, the Proposed Plan has identified the Lyall Bay surfing breaks (The Corner and Airport Rights) as being of regional significance. The Proposed Plan has also identified that the area around the Airport is significant as indigenous bird habitat. Relevant objectives and policies seek that ecosystems and habitats with significant indigenous biodiversity values are protected and restored, and that significant surf breaks are protected from inappropriate use and development<sup>66</sup>. More particularly, Policy P51 seeks that use and development in and adjacent to the regionally significant surf breaks identified in Schedule K (surf breaks) shall be managed by minimising the adverse effects on:

- (a) Natural processes, currents, seabed morphology and swell corridors that contribute to significant surf breaks; and
- (b) Access to significant surf breaks within the CMA, on a permanent or ongoing basis.

Despite the Proposed Plan identifying the area immediately adjacent to the Airport as being significant habitat for indigenous birds, the ecological assessments prepared for the Project have not identified any significant values for indigenous birds in the immediate area. It is noted that blue penguins are likely to breed nearby at Moa Point, but it is unlikely that these species would nest along the wall at the end of the runway. The assessments consider that this area is unlikely to be significant for indigenous bird species on the basis that it is already highly modified and is a noisy, active environment largely due to the presence of the existing Airport. It is also noted that to ensure aircraft safety the Airport also undertakes active bird control activities which are likely to have altered the composition of species resident in, or regularly using, and the suitability of, the Airport environs for significant bird habitat.

The assessments recognise that a popular surfing amenity exists within Lyall Bay and that this will likely be altered due to the proposed runway extension without any mitigation. While this is not consistent with the intent of Policy P51 which seeks to minimise adverse effects and maintain access to these scheduled surf breaks. WIAL is proposing to mitigate or offset the effects of the proposal on the surfing opportunities within Lyall Bay. This is through the use of the SWFS which will be designed so as to create a left and right breaking wave which does not currently exist consistently today. This is consistent with other policies in the Proposed Plan such as P133 which seeks that the adverse effects of use and development in the CMA on recreational values is managed by providing a diverse range of recreational opportunities while avoiding conflicts and safety issues.

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<sup>66</sup> Objectives O35 and O37.

Objectives O39 to O41 relate to the management of air discharges, and aim to reduce the adverse effects of air discharge contaminants on amenity values and people's wellbeing. In terms of the potential for dust discharges/particulates to air during construction of the Project, Chapter 8 and **Technical Report 21** details the measures to be adopted to reduce the likelihood of dust generation.

The Proposed Plan also contains objectives and policies relating to the management of discharges and seeks that discharges are appropriately controlled. Given that essentially the Project is a large earth moving exercise, appropriate erosion and sediment control measures will be in place to prevent sediment runoff and excess discharge into the surrounding CMA. These measures are described in detail in the ESCP, as discussed above.

Section 3.13 relates to coastal management and Objective O53 seeks that use and development of the CMA has a functional need or operational requirement to be located there. Objective O56 requires that new development in the CMA is of a scale, density and design that is compatible with its location in the coastal environment.

Related policy, P132 similarly seeks that use and development in the CMA has a functional need, or has an operational requirement to be located there, and there is no reasonably practicable alternative to locating in the CMA. Policy P145 is specific to reclamation activities and similar to the NZCPS Policy 10, it requires that such activities are avoided except where it is associated with the development, operation, maintenance and upgrade of regionally significant infrastructure, there are no other locations outside the CMA available for the activity, and there are no other practicable alternatives.

As discussed above, the existing Airport is constrained at either end by the CMA in both a locational and operational sense. To facilitate long haul flights to and from Wellington and enhance operational capability at the Airport, an extension to the runway is required. An investigation into alternatives methods has determined that the most practicable means of providing this is by a land reclamation to the south of the existing runway.

The Proposed Plan also contains provisions relating to the management of underwater noise. Policy P151 requires that the use and development in the CMA is managed to minimise the adverse effects of underwater noise on the health and safety on marine fauna and the health and amenity values of users of the CMA. The potential installation of stone columns in underlying sediments and/or vibro-coring to support the rock dyke and runway fill material is likely to generate underwater noise. The assessment has found that the effects of this underwater noise on sensitive fish species that produce, and are receptive to sound are likely to be negligible. Birds and mammals are already used to a noisy environment in this area and can also move away and thus are unlikely to be significantly impacted. Any effects, if they did occur, would be short term and localised.

Recreational users of the CMA are also used to a reasonably high degree of existing ambient noise levels (i.e. from aircraft and other Airport operations), and for the majority of the recreational pursuits these will be located a reasonable distance from

any additional noise sources created during the construction of the proposed runway extension. Any effects are also of a temporary nature.

## 9.6 WELLINGTON CITY DISTRICT PLAN

The WCC District Plan contains a suite of objectives and policies that are relevant to the consideration of the proposed runway extension. The majority of the Project affects land that is zoned Airport Precinct and Open Space B or Road, however ancillary activities such as two of the construction compounds sites are proposed to be situated on land that is zone Business 1. Objectives and policies relating to adjoining zones such as the Outer Residential Zone are also relevant to this assessment given that some of the actual or potential effects of the proposed runway extension will extend beyond the footprint of the Project area (eg. traffic movements and visual and amenity effects).

### 9.6.1 Airport and Golf Course Recreation Precinct

In terms of the District Plan provisions Wellington Airport is largely provided for by way of an existing airport zone (Airport and Golf Course Precinct). Within this chapter the Airport is recognised as being the country's air transport hub and busiest domestic airport. It recognises that the Airport is a strategic transport node and it plays an important role in providing for the social and economic wellbeing of the city, the region and the nation. It sets out that the plan provisions recognise the strategic importance of the Airport by providing for its continued use and development.

The approach adopted in the District Plan is to separate the Airport into five different "sub-areas" in order to adequately provide for their distinct character and potential for development. These sub-areas are defined as:

- Terminal Area;
- Rongotai Ridge (which is Wexford Hill);
- Broadway Area;
- South Coast Area; and
- West Side.

There are different policies applicable to each area.

Objective 10.2.1 seeks to promote the safe, effective and efficient operation of the Airport. Policies in support seek to provide for activities which will ensure the safe, effective, and efficient use of the Airport area as a strategic transport node for the city, region and nation. The proposed runway extension is a logical extension to the existing Airport and will provide for the ongoing safe, effective and efficient operation of the Airport.

Objective 10.2.4 seeks to protect the character and amenities of identified areas within the Airport area from inappropriate non airport related uses and development. The explanatory text identifies such areas as including the Terminal Area, Rongotai Ridge (Wexford Hill), Broadway Area, the South Coast Area, and the West Side.

Policy 10.2.4.5 seeks to allow non airport activities in the South Coast Area, in a manner which will protect and enhance the character of the south coast. The explanatory text attached to this policy sets out that this area provides a secondary entrance to the Airport for traffic from the southern suburbs, and that this entry is unattractive and that the land and buildings are of low amenity value. It goes on to say that land in this locality is used for a variety of purposes associated with the Airport, and that there are opportunities to improve and rationalise the use of the land in this area.

During construction of the proposed runway extension this area may be utilised as a potential construction laydown, temporary office or storage/stockpile area. While there may be some visual or amenity related effects arising from this use, it is temporary, and after construction of the extension the area will be rehabilitated. The landscape and urban design measures that are proposed will also assist in improving the South Coast Area which directly adjoins the Airport.

Objective 10.2.5 seeks to protect the amenities of areas surrounding the Airport from adverse environmental effects. Supporting policies seek to exercise an appropriate level of control over Airport and ancillary activities for the avoidance or mitigation of adverse effects, and to ensure a reasonable protection of residential and school uses from Airport activities by providing controls on bulk and location, ensuring sufficient space is available for landscape design and screening, and by retaining a buffer of land of a recreational nature to the east of the Airport. Policy 10.2.5.4 seeks to manage the noise environment to maintain and where possible enhance community health and welfare.

Construction activities and visual effects could adversely affect the amenity values of areas surrounding the Airport. With regard to construction noise, as far as practicable adherence to the relevant New Zealand standards will be complied with, however this is unlikely to be achievable during certain stages of the night time construction work. This may cause sleep disturbances for those residents living in close proximity to the construction site (i.e. Moa Point). To mitigate this potential effect, WIAL has offered to purchase the most affected properties along Moa Point Road, or via the proposed conditions will offer to insulate affected properties, or temporarily relocate these affected residents during particularly noisy construction periods. It is acknowledged that these mitigation measures need to be worked through and agreed with the individuals affected and this will be facilitated by the proposed conditions. Adverse visual effects arising from construction activities will be temporary.

In the long term the proposed runway extension will substantially change the existing view for those closest neighbouring properties.

Operationally, aircraft utilising the extended runway will comply with the Airport's ANB and other rules relating to the management of aircraft noise that are currently within the District Plan.

## 9.6.2 Open Space

To the south and east of the Airport the area is zoned Open Space 'B' and Conservation. Open Space 'B' is explained in the District Plan as comprising land

which is valued for its natural character and informal open spaces. It involves areas that are used for types of recreation that, in the broadest sense, do not involve buildings or structures. It explains that most of these areas are vegetated and often have ecological values, or may buffer conservation sites.

Open Space objectives seek to maintain, protect and enhance the open spaces of Wellington City<sup>67</sup>. Specific areas of open space throughout the city are recognised in the policies. The area surrounding the Airport is not listed. More generally Objective 16.5.2 seeks to maintain and enhance natural features that contribute to Wellington's natural environment<sup>68</sup>. Supporting policies seek to identify and protect from development and visual obstruction landforms and landscape elements that are significant in context of the Wellington landscape, and in particular significant escarpments and coastal cliffs, and to encourage retention of existing native vegetation and where appropriate re-introduce native cover.

While it is acknowledged that the area affected by the extension is zoned Open Space B and is mostly owned by the WCC for reserve purposes, this particular area does not currently hold any particular or significant natural character or open space value. The area has been created from the original reclamation of the Airport and does not provide a natural edge to the CMA. The landscape and urban design features that are proposed and described earlier in this report will also assist in mitigating effects on the Open Space Zone. The mitigation proposed is also consistent with the Council's open space and recreation objectives set out in documents such as the South Coast Management Plan.

### 9.6.3 Residential and Business Zones

The objectives and policies in the residential and business zones of the District Plan largely seek to ensure appropriate residential, business and support activities are established. Consistent with this, objectives and policies seek to maintain an appropriate level of character and amenity and that any potential adverse effects are able to be satisfactorily avoided, remedied or mitigated<sup>69</sup>. Policies also seek to control the adverse effects of noise<sup>70</sup> and manage the road network in and around these areas to avoid, remedy or mitigate adverse effects<sup>71</sup>.

As discussed above, during the construction of the proposed runway extension traffic, machinery and noise could give rise to adverse effects on amenity values within adjoining neighbourhoods. Mitigation to minimise potential conflicts and nuisance effects is proposed. This includes the coordination of construction traffic movements to avoid peak traffic times and sequencing traffic through the day time and night time to ensure sufficient capacity on the road network and mitigate any adverse noise effects, particularly during the night time haulage that is proposed. A CTMP will also be prepared, and adhered to, in order to avoid or mitigate potential traffic effects on other roads users including cyclists.

<sup>67</sup> Objective 16.5.1.

<sup>68</sup> Objective 16.5.2.

<sup>69</sup> Policy 33.2.2.1.

<sup>70</sup> Policies 33.2.2.9 and 4.2.7.2.

<sup>71</sup> Policy 4.2.12.2.

Where practicable construction noise will comply with relevant construction standards and it has been assessed that daytime noise will generally comply and not cause nuisance or disruption for the surrounding community given the existing level of ambient noise (aircrafts, traffic, etc.). Night time construction activities have the potential to generate adverse noise effects on those living immediately adjacent to the Construction Site (Moa Point Road). The measures that are available to manage these effects have been described above.

It has been assessed that from an operational perspective the proposed runway extension and Code E aircraft would not cause a significant change to the overall noise exposure in the community and noise from aircraft operations would continue to comply with the ANB.

Broader effects of Airport growth and the impact of the proposed runway extension on the city's road network have also been considered by TDG. They have assessed that the likely traffic generation arising from an increase in long haul flights and international passenger numbers, is not predicted to be significantly greater than what would occur under the current growth scenario for the Airport.

Objectives and policies relating to the residential and business areas also seek to maintain a compact and vibrant city<sup>72</sup>. The ability to attract long haul flights to and from Wellington Airport, increase accessibility for the city and to enhance economic and tourism growth is assessed as being consistent with these provisions.

These chapters of the District Plan also seek to recognise that in some locations residential and business areas adjoin areas of open space, natural features and the coastal environment. Objective 4.2.9 seeks to maintain and enhance the quality of the coastal environment within and adjoining Residential Areas. Supporting policies seek to maintain the public's ability to use and enjoy the coastal environment by requiring that access to and along the CMA is maintained, and enhanced where appropriate and practicable, and to ensure that any developments near the CMA are designed to maintain and enhance the character of the coastal environment<sup>73</sup>.

Given the high degree of modification that already exists in the area, the proposed runway extension is not assessed as having a significant or adverse effect on natural character values within the surrounding coastal environment. Mitigation is also proposed to enhance public access to certain areas of the CMA, as well as other features along this part of the coastal environment and mitigate if not create a better surfing experience within Lyall Bay which does not currently exist today. The proposal is not assessed as being inconsistent with these objectives and policies.

The District Plan also contains objectives and policies relating to the management of natural hazards. This has been discussed above and the same assessment applies equally here.

<sup>72</sup> For example Policy 33.2.1.3 and Policy 4.2.1.1.

<sup>73</sup> Policies 4.2.9.1 – 4.2.9.3. Similar outcomes are sought via Objective 33.2.10 and Policies 33.2.10.1 – 33.2.10.3 relating to the business zones which adjoin coastal areas.



Provisions also relate to the management of hazardous substances<sup>74</sup>. The use of hazardous substances during the construction of the Project is not expected to be significant but there may be some use associated with refuelling of construction machinery and vehicles (ie. petrol/diesel). All appropriate care and best practice will be utilised with respect to the storage and use of any hazardous substances on site and this will be detailed in the CMP.

Objective 4.2.15 seeks to facilitate and enable the exercise of tino rangatiratanga and kaitiakitanga by Wellington's tangata whenua and other Maori. Policy 4.2.15.3 requires that in considering resource consents, the Council will take into account the principles of the Treaty of Waitangi/Te Tiriti o Waitangi. WIAL has undertaken consultation with the Iwi and it is understood that the key cultural interests in regard to the site and proposed runway extension relate predominately to the potential impacts on water quality, habitat loss and the mauri of the CMA. This has been discussed above and ongoing consultation and input from Iwi with regard to the mitigation strategies to address these concerns will be sought.

#### 9.6.4 Heritage

Objectives and policies in Chapter 20 of the District Plan seek to recognise and protect the heritage values of buildings, objects, areas and historic sites located in Wellington. Policy 20.2.1.11 seeks to avoid, remedy or mitigate the adverse effects of development on the archaeological values of any site. An assessment of the heritage and archaeological values of the Project site has been undertaken (refer **Technical Report 22**). This has confirmed that no significant sites or features will be directly affected by the proposed runway extension. Given the modification that has already occurred in the area to date, the likelihood of discovery is also considered to be low, however it is recommended to establish and adhere to an accidental discovery protocol during construction.

#### 9.6.5 Earthworks

Chapter 29 of the District Plan contains provisions relating to the management of earthworks. Objective 29.2.1 seeks to provide for the use, development and protection of land and physical resources while avoiding, remedying or mitigating any adverse effects of earthworks and associated structures on the environment. Policy 29.2.1.4 requires earthworks to be designed and managed to minimise erosion, and the movement of dust and sediment beyond the area of the work, particularly to areas of the CMA.

As described above the proposed runway extension is essentially a large earth moving exercise and all appropriate and best practice measures will be undertaken to mitigate any adverse effect arising from the physical earthwork activities, both within the CMA and the areas adjoining it. The CMP and ESCP will ensure that all earthwork activities including the removal of the hillock is undertaken to minimise any potential sediment runoff. Dust discharges will be mitigated as far as practicable in accordance with the measures set out in the CAQMP.

<sup>74</sup> And seek to prevent or mitigate adverse effects of the storage, use, disposal or transportation of hazardous substances.

Policy 29.2.1.7 seeks to ensure that earthworks and associated structures are designed and landscaped (where appropriate) to reflect natural landforms and to reduce and soften their visual impact having regard to the character and visual amenity of the local area. Policy 29.2.1.8 seeks to manage earthworks in Open Space areas in accordance with the different purpose and use that these recreation and conservation areas have for the city.

The finished profile of the main earthwork areas (ie. the proposed runway extension and the hillock area) will be consistent with the form and functioning of an operational airport. This is considered to be appropriate given the existing activities that take place in and around these areas. Other areas subject to work, such as the Moa Point Beach enhancement area will all be finished in accordance with the landscape and urban design objectives agreed with key stakeholders, Iwi and the affected community.

Policy 29.2.1.11 seeks to ensure that the transport of earth or construction fill material, to and from a site, is undertaken in a way that is safe and minimises adverse effects on surrounding amenity and the roading network. The key to managing construction traffic effects lies in confirming transportation windows that avoid busy commuter traffic peaks, school peaks, business peaks, and weekends, and concentrates movements to the off-peak periods, which afford road capacity and less vehicle and land use conflict. In addition, due to constraints on certain intersections and night time noise, a sequential approach to the hourly traffic haulage traffic movement is proposed.

Having examined the details of the existing transportation environment across the road network serving the Airport and its proposed runway construction requirements, the assessment concludes that the existing road network can provide safe and convenient access to and from the proposed work sites with minimal impact on the existing networks.

## 9.7 RELEVANT OTHER MATTERS

The relevant other matters in terms of section 104(1)(c) have been identified in Chapter 2 and Appendix B. This includes both statutory documents (for example, those required to be prepared under other legislation) and those non-statutory documents that, while not having a regulatory function under the RMA, have been through a public process and/or are important policy or strategic documents that set out national or regional direction on key resource or environmental matters relevant to this Project.

On a broader level investing in high quality infrastructure and supporting growth of the aviation sector is consistent with the directions set out in national documents including Connection New Zealand, the International Air Transport Policy Statement and the Thirty Year National Infrastructure Plan 2015. These directions include:

- Wellington International Airport is a major trade asset for New Zealand;
- An effective, efficient, safe, secure, accessible and resilient transport and infrastructure system will support the growth of New Zealand's economy; and

- Better access to major and developing air travel markets such as within Asia presents an opportunity for New Zealand to export goods and services to these markets.

More specifically the proposed runway extension is intended to help the New Zealand government to achieve its International Air Transport Policy Statement objective by:

- Providing additional opportunities for airlines to provide their customers in the Wellington region with improved connectivity to the rest of the world;
- Facilitating increased trade in goods and services, including tourism, between businesses in the Wellington region and the rest of the world; and
- Reducing barriers to increased competition in both the markets for airport and airline services in the Wellington region.

The Project is consistent with the Tourism 2025 Strategic Plan in seeking to sustainably grow long haul opportunities for New Zealand and would support the Tourism 2025 goals by:

- Providing new, direct non-stop services, including to targeted areas in the Pacific Rim;
- Allowing growth in international visitation while not placing significant pressure on infrastructure; and
- Creating opportunities to increase passenger volumes on existing services as well as improve the value of passenger mix, both identified as important in the framework.

The importance of Wellington Airport as a key contributor to the city's and region's economic prosperity and growth is also recognised in a number of regional and district strategic documents<sup>75</sup>. A number of these documents also specifically recognise and support the proposal to extend the runway to facilitate long haul flights to and from Wellington Airport<sup>76</sup>.

With regard to the Wellington Conservation Management Strategy (**CMS**), the Project will not have any effects on the areas that are managed by DoC on the Wellington south coast. The effects of the Project on coastal processes and ecosystems and natural character values within the Lyall Bay area have been considered and mitigation as set out above is proposed to manage any potential effects. This is consistent with the general intent of the CMS.

<sup>75</sup> Manawatu-Whanganui Regional Growth Study, Wellington Regional Public Transport Plan 2014, Regional Freight Plan 2011.

<sup>76</sup> Wellington Regional Strategy 2012, Wellington Visitor Strategy 2015, Wellington City Long Term Plan 2015 – 2025, Wellington Towards 2040: Smart Capital.

Maintaining the Airport in its current location and improving transportation networks and links to the city is a consistent theme in the city's urban design strategies and policy documents.

The proposed landscape and urban design mitigation features have been developed taking into consideration the outcomes and objectives in the South Coast Management Plan 2002.

## 9.8 SECTION 105

Section 105(1) of the RMA sets out the matters that a consent authority must have regard to when considering a resource consent for a discharge permit. In particular, consideration needs to be given to the nature of the discharge and the sensitivity of the receiving environment to adverse effects, the Applicant's reasons for the proposed choice, as well as any possible alternative methods of discharges.

The construction activities essentially comprise a large earthwork exercise in order to reclaim a portion of the CMA. The resultant effect of this is a potential increase in sediment laden discharges to and within the CMA, and potential dust discharges.

In terms of discharges of suspended sediment to the CMA, the assessments quantifying the receiving environment have determined that although water quality in the area is high, there are no significant or particularly sensitive ecosystems or habitats that will be affected. The assessment also finds that most of the benthic and reef communities are already reasonably tolerant to episodic high suspended sediment levels due to storms and high energy wave events. Other species such as fish and marine mammals are not likely to be particularly sensitive to the effects of the discharges on the basis that they will swim away from any disturbance or high turbidity areas.

All appropriate and necessary measures will also be employed during the construction to also ensure that sediment discharges to and within the CMA are confined to the minimal extent practicable. These measures have been arrived at following a consideration of alternatives and will be implemented via the ESCP and may include deploying silt curtains around the working areas and using construction equipment and methodologies that minimise excessive disturbances of the seabed, and using clean fill. In addition to these mitigation features, monitoring of suspended sediment levels relative to the existing background conditions (i.e. to cater for storm events where turbidity levels will already be elevated) will be undertaken. Should the specified trigger levels be reached, this will signal an investigation into the likely cause of the breach and the implementation of mitigation or remediation if required (i.e. an issue with the rock dyke that might need remediation). These measures shall ensure that any significant adverse effects on water quality, ecosystems and the life supporting capacity of the water outside a mixing zone of 150m are appropriately avoided.

In terms of potential dust discharges and the surrounding environment, sensitive land uses include neighbouring residential properties and the Airport itself. Dust control will be employed at all times during construction, and will be continuously monitored to ensure adverse effects do not arise. With appropriate measures employed the

assessments have determined that dust discharges arising from construction will be suitably controlled so as to not generate any adverse effects on these surrounding sensitive land use activities.

## 9.9 SECTION 107

Section 107 of the RMA places a restriction on the grant of discharge permits to water, if, after reasonable mixing, the contaminant or water discharges is likely to give rise to all or any of the following effects in the receiving waters:

- The production of any conspicuous oil or grease films, scums or foams, or floatable or suspended materials;
- Any conspicuous change in the colour or visual clarity;
- Any emissions of objectionable odour;
- Any significant adverse effects on aquatic life.

The assessments have determined that outside a zone of reasonable mixing (150m), the discharge of suspended sediments arising from earthworks and the infilling of the reclamation is unlikely to result in a conspicuous change in the colour or visual clarity of the receiving water, nor will it have any significant adverse effects on aquatic life. This is supported by the proposed construction methodology and best practice erosion and sediment control measures that will be adopted throughout the duration of the construction.

Monitoring of predicted sediment plume as well as turbidity and suspended sediment levels is also proposed to confirm the assessment findings and ensure adverse effects do not arise. If during the construction the monitoring records elevated turbidity levels (based on ecological advice) the proposed conditions require that prompt action is taken to identify the likely cause and to remedy the situation if a fault or issue is found. Further action or investigation is required if turbidity levels remain above the identified trigger levels for a period of more than 48 hours. If such a scenario were to occur, it is noted that any such discharge would only likely be for a temporary duration and appropriate steps will be taken to remedy or mitigate any adverse effects arising if this is possible.

## 9.10 ASSESSMENT OF PART 2 MATTERS AND CONCLUSION

Section 104(1)(b) of the RMA sets out the planning documents that decision makers are required to have regard to when considering an application for resource consent and any submissions received. Any such consideration is, however, subject to Part 2 of the RMA which sets out the purpose and principles of the RMA.

The purpose of the RMA as expressed in section 5 is to promote the sustainable management of natural and physical resources, with 'sustainable management' defined in section 5(2) as:

*managing the use, development and protection of natural and physical resources in a manner which enables people and communities to provide for their social, economic and cultural wellbeing, and their health and safety, while:*

- (a) *Sustaining the potential of natural and physical resources (excluding minerals) to meet the reasonably foreseeable needs of future generations; and*
- (b) *Safeguarding the life-supporting capacity of air, water, soil and ecosystems; and*
- (c) *Avoiding, remedying or mitigating any adverse effects of activities on the environment.*

Part 2 provides further direction on the matters of national importance (section 6), other matters (section 7) and the principles of the Treaty of Waitangi (section 8) which need to be considered and responded to.

Applying section 5 of the RMA (and the other relevant matters under Part 2 of the Act) can involve the assessment of conflicting considerations, including the positive and adverse effects of a proposed development. In addition, the consideration of the matters in sections 5(2)(a) – (c) can often be informed by the direction provided in the objectives and policies in the relevant statutory planning documents.

In terms of section 5 of the RMA, the construction of the proposed runway extension will enable people and communities to provide for their social, economic and cultural wellbeing and for their health and safety, by:

- Providing for the economic growth of the city, region and the nation by improving accessibility and connectivity to the rest of the world by enabling larger Code E aircraft to operate long haul or on ‘fifth freedom’ flights to and from the Airport.
- Improving the existing operational capability and efficiency of the Airport by removing the restrictions airline operators currently face with smaller Code C aircraft (Airbus A320 or Boeing 737-800) on the longer trans-Tasman and Pacific routes, particularly during warmer still conditions.
- Providing significant community, social and transport benefits including:
  - Reducing travel times for passengers using the Airport;
  - Lowering fares and charges at the Airport;
  - Greater frequency and choice of airline services.
- Business and migrant attraction as result of direct air links to the city;
- Regional attraction of international students;
- Enabling Wellington Airport to become an option to divert for wide bodied aircraft.

In balancing these considerations with the matters in section 5(2)(a) – (c) of the RMA, the following overall assessment is derived from the planning assessment and technical reports prepared in support of these applications:

- In terms of sustaining the potential of natural and physical resources for future generations:



- The Project is intended to meet and enhance the growing air transportation needs of the city and the region.
- Investing in the Airport's infrastructure and enhancing its operational capabilities aligns with a number of key regional and city strategies which recognise that the Airport in its current location is a significant infrastructural asset and is a driver of economic activity and growth for the City and region.
- The environment within which the Airport is located is highly modified, and the adverse effects on that environment will not be significant and where possible can be mitigated.
- The Project will safeguard the life supporting capacity:
  - Of air, as the Project will have minor or less than minor adverse effects on air quality;
  - Of water, because although a portion of the CMA will be lost, it is within an already highly modified environment, the natural character values are not significant in this location and the effects arising from the construction activities (ie. disturbances and discharges to the CMA) will be temporary, and best practice measures will be adopted to avoid or mitigate any potential adverse effect arising from discharges to the CMA;
  - Of soils, by the management of construction works to suitably avoid or mitigate any potential adverse effects arising from erosion and land disturbance; and
  - Of ecosystems, by mitigating habitat loss through ecological enhancement measures that are to be incorporated into the design of the rock dyke to encourage recolonization of species.
- To the extent that it has been practicable to do so, the Project avoids, remedies or mitigate adverse effects. This includes measures to manage adverse effects on water quality, ecology, amenity values, landscape and visual, recreational opportunities and public access. This are guided by a series of management plans and conditions as set out in Chapter 8, together with the offer by WIAL to purchase any Moa Point property where that is requested by the property owner.

The Project recognises and provides for the matters within section 6 of the RMA, particularly in the following aspects:

- While there will be some changes and potential adverse effects on some natural character attributes on the eastern side of Lyall Bay, the bay's overall level of natural character will largely remain unchanged following the construction of the airport runway extension.
- Furthermore the proposed reclamation and runway extension is not considered to be an inappropriate use and development of the CMA in the location proposed as the natural character has already been influenced by existing Airport activities. This is on the basis that the Airport is currently operationally and functionally

constrained by the presence of the CMA at either end of the existing runway, and an extension into the CMA via land reclamation is the only practicable option for providing for an extension in this area. The subject area is already characteristic of a highly modified coastal environment.

- The assessments have not found there to be any significant indigenous vegetation or habitats that will be adversely affected by the proposed runway extension. That said, the mitigation including the ecological enhancement features of the rock dyke and eastern Moa Point beach enhancement are likely to result in an overall improvement of potential habitat within the immediate coastal environment.
- The maintenance and enhancement of public access to and along the CMA is provided through the proposed urban design and landscape treatments that will be implemented as part of the overall Project.
- The relationship of Maori and their culture and traditions with their ancestral lands, water, sites, Wahi tapu, and other taonga has been recognised by WIAL through the engagement with appropriate tangata whenua of the area, the preparation of the Cultural Values Report and draft CIAs, as well as through the development of mitigation measures in response to any potential cultural effects being identified.
- The Project does not impact on any known sites of historic heritage, however an accidental discovery protocol will be in place throughout the construction period. Customary fishing rights within the immediately affected area may be temporarily displaced during the construction phase, and will be lost directly under the reclamation area, however it is recognised in the assessments that this is a small area and will be mitigated through the proposed ecological enhancements and additional artificial reef that will be created by the proposed extension.

The Project has also had particular regard to and has appropriately responded to the matters in sections 7 and 8 of the RMA, as follows:

- The kaitakitanga of tangata whenua has been recognised in seeking specific cultural impact assessments from Ngati Toa and Raukaura Consultants on behalf of Te Atiawa/Taranaki Whanui ki Te Upoko o Te Ika a Maui. This process has also taken into account the principles of the Treaty of Waitangi.
- The ethic of stewardship has been recognised through:
  - Engagement with and participation of tangata whenua in consultation meetings with WIAL throughout the Project's development process; and
  - Engagement with key stakeholders (eg. DoC, WCC, Greater Wellington) who have a specific interest in and/or who have exercised stewardship over particular resources.

- The Project will improve the efficient operation of Wellington Airport as a physical resource and will provide significant benefits to the city, wider region and nation including by;
  - Removing the constraint imposed by the length of the current runway would increase the efficiency with which the Airport and airline services are (refer **Technical Report 4**):
    - Supplied at Wellington Airport; productive efficiency through enabling the use of more technically and economically efficient wide bodied aircraft and lowering the cost of using existing narrow bodied aircraft; and
    - Used by passengers and airfreight users; efficient consumption of airlines services would be improved from lower costs, increased frequency of flights and new routes.
  - Additional benefits could occur through:
    - Increased flexibility of Airports and airlines to adjust to future changes in the economic environment, including the ability to expand the supply of Airport and airline services to meet unexpected future increases in demand, as well as the ability to adjust to changes in technology and costs;
    - Increased sales of goods and services to tourists who would not have visited New Zealand without the efficiency gains in airline services;
    - Increased competition in the markets for airline services; and
    - Improving distributional equity by improving the access of individuals and businesses in the Wellington region to affordable, convenient and demand-responsive passenger airline and airfreight services.
- The proposed runway extension and associated activities will not adversely affect any significant ecosystems or habitats, and while an area of existing habitat will be lost within the CMA this effect will be mitigated through proposed habitat enhancements and beach nourishment. Once construction of the proposed runway extension and associated facilities is completed, the species affected will recover and there will be no long term impacts on the intrinsic values of these ecosystems.
- In the longer term and operationally the proposed runway extension is not expected to result in a significant change to amenity values, or on quality of the environment in and around the surrounding area. This is because the extension will appear as an extension to the existing Airport environs where such activity is already an accepted part of the existing environment. Urban design features and additional landscape treatments are also expected to improve the current amenity of existing areas surrounding the Airport and the extension. The SWFS will mitigate the effects arising on surfing amenity.
- During construction, it is likely that there will be adverse effects on the amenity values and quality of the environment of those residents living in close proximity to the construction site. This is likely to arise from construction traffic, increased

noise and visual effects of construction machinery, lighting, vessels and other construction related activities. As far as practicable, measures will be established via the CMP, ESCP, CTMP and CNVMP to minimise these potential effects. However due to the constraints imposed of an operational Airport, night time construction work on the extension will be required. This will have the potential to disturb sleep for those residents living nearby at Moa Point Road. To potentially mitigate this effect, WIAL will work with affected residents to develop an appropriate and acceptable mitigation package. This may include acoustic insulation, temporary rehoming or property purchase agreements.

- The effects of climate change (increased storm surges and sea level rise) are not expected to generate any adverse effects on the integrity or form of the proposed runway extension. The design of the extension is a key mitigating factor in being able to withstand storm and high wave energy events, and the finished ground level is sufficiently above the predicted increase in sea level at least for the next 100 years.

The NZCPS, the RPS, various plans and the relevant objectives, policies and rules, provide guidance, in accordance with hierarchical principles embodied in the RMA for assessing this application in terms of its impacts on factors such as natural character, landscape, ecology, coastal processes, recreation, public access and amenity values. The technical and scientific assessments that have been undertaken confirm that WIAL has accounted for all of the potential or actual effects arising from the proposed runway extension and where an adverse effect has been identified appropriate steps have been taken to avoid, remedy or mitigate these to the greatest extent that is practicable.

Overall, when the benefits of the Project are considered alongside the proposed measures to avoid, remedy and mitigate the associated adverse effects, it is considered that the Project will promote the sustainable management of natural and physical resources and is consistent with the purpose and principles of the RMA.