
REAVNZ

Statement of Responsibility

This Statement of Performance Expectations is submitted by the Board of Directors of Research and Education Advanced Network New Zealand Limited (REANNZ), pursuant to the Crown Entities Act 2004. It sets out the service expectations for REANNZ for the period 1 July 2017 to 30 June 2018.

REANNZ's Board is responsible for the prospective financial statements and statement of performance expectations contained in this document, including the appropriateness of the assumptions underlying them. It is also responsible for internal control systems, which provide reasonable assurance as to the integrity and reliability of financial reporting.

Jim Donovan
Chair

Ross Peat
Deputy Chair

30 June 2017

COMMUNITIES THAT SHARE AND CONVERT DATA INTO KNOWLEDGE WILL THRIVE /

Data drives modern economies. While goods manufacturing and finance were the hallmarks of the global economy in the 20th century, the 21st century is being defined by global flows of data and information.[1] Communities that share and convert data into knowledge will thrive.

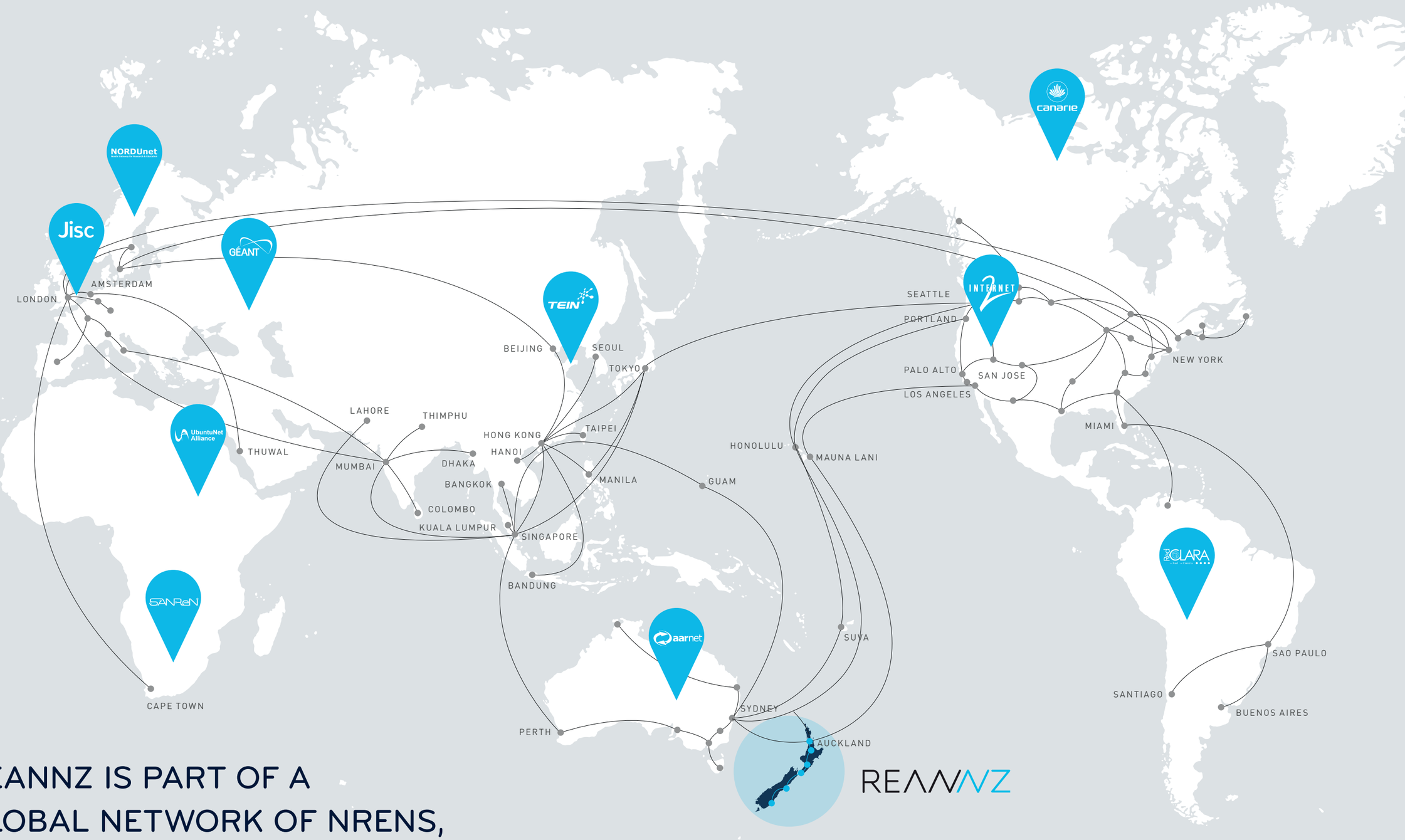
REANNZ is New Zealand's Crown-owned, high-performance network solutions provider. We're part of a worldwide network of research and education infrastructure that supports the global flow of data and information between researchers, educators and innovators; connecting them at speed to the tools, people, applications and resources they need to be successful in their fields, wherever they may be.

When our people have access to the network infrastructure required to pursue and achieve excellence, this creates a ripple effect, attracting more funding, more talent, greater international collaboration and new breakthroughs. This positive cycle delivers benefits for all New Zealanders through improved educational, social, economic and environmental outcomes.

Access to this infrastructure also provides a platform on which transformational change can take place. It creates opportunities to disrupt the way education is delivered, to revolutionise research methods, to improve scientific outcomes and to increase productivity in unprecedented ways.

A national research and education network (NREN) is essential to the success of a digital nation. High-performance connectivity is a pre-requisite for competition in a world where success requires access to resources on a global scale. New Zealanders need not be constrained by their physical location on the planet. With the local and global infrastructure in place we now need to encourage and inspire New Zealanders to grow their ambitions and to take advantage.

1 Digital Globalisation: The New Era of Global Flows, McKinsey Global Institute, March 2016.



REANNZ

REANNZ IS PART OF A GLOBAL NETWORK OF NRENS, CONNECTING RESEARCHERS ACROSS THE GLOBE TO SHARE INFORMATION AND IDEAS.

ABOUT REANNZ

REANNZ's members are New Zealand's Universities, Crown Research Institutes, Polytechnics and other research, education and innovative organisations.

The impact of our high-performance network extends beyond our members to the collaborative research initiatives in which they participate. These include the National Science Challenges, Centres of Research Excellence and the programmes funded by Marsden grants, Royal Society of New Zealand grants, Health Research Council grants and MBIE contestable funding.

We are currently funded through a mix of membership fees and Crown funding. Our $4 million per annum funding agreement with the Crown expired in June 2017 and we have been engaging with stakeholders to re-emphasise the importance of the national system management and international capability that this funding supports.

In June 2017 we received confirmation from the Minister of Science and Innovation, Hon Paul Goldsmith, that the Government will make a new, strategic investment in REANNZ of $3 million per year. The investment will focus on the purchase of specialist services and activities that enable cost-effective research and high-performance science applications, that are not readily available or cost-effective through other telecommunications providers. This funding will come from the Strategic Science Investment Fund (SSIF).

We are now working with the Ministry of Business, Innovation and Employment to agree the specifics of this new investment, including the key performance indicators by which success will be measured. Indications are that the term of the funding will be aligned with the seven-year investment timeframe under the SSIF. This work may change some of the targets we have outlined in this Statement of Performance Expectations.

Over the coming year we will also be working with our members and other key stakeholders to identify and agree how to best address the $1 million difference between the previous Crown Funding Agreement and the SSIF investment. We see this as a broader opportunity to review and update our overall core network services model, so it remains relevant and competitive for our various members' future national and international research, education, internet and enterprise needs.

This Statement of Performance Expectations assumes that the funding requirements will be agreed, and completing this work remains a key priority for us in the coming year.

Globally, research and education networks are "closed systems". A limited number of participants contribute to and utilise a long-term infrastructure base. The specific needs of this small customer base requires us to manage our infrastructure for optimal performance, supporting the high-end requirements of New Zealand's researchers, as well as the needs of teaching, learning and innovation.

Our network is deliberately architected and managed to deliver optimal, high-performance for our users. This means:

- The network backbone is managed to accommodate large but unpredictable bursts in traffic, from the most demanding of scientific applications. As a result, the network is not congested, allowing all users to gain benefits from high-capacity and high-speed network performance;
- We focus on transfer performance; this means managing network equipment to ensure there is no packet loss (which can arise from congestion or poorly configured network equipment), and minimal latency and jitter (the time taken for a packet of data to get from one point to another and the consistency of that experience). This is essential for both transfer speed and for transfer quality (getting everything there fast, and complete);
- Our network is highly-reliable, designed to be resilient and highly-available;
- We are part of a global partnership of over 117 national research and education networks (NRENs) that have the same commitment to high-performance; allowing our users to collaborate with their peers worldwide and ensuring their connectivity experience is seamless from source to destination;
- We work closely with our members to help ensure that high-performance is possible from their front door, by managing their access connections and devices – tuning them for maximum performance;
- We look to provide tailored services that meet the unique needs of research, education and innovation users and their communities. These are services that are not available, or are cost-prohibitive, in the open market;
- We invest in talent, so we can provide our members with quality advice, expertise and technology leadership.

MAJOR INITIATIVES FOR 2017–18

Tailored services for R&E

Goals

Broaden services and increase uptake to increase productivity and support the needs of our member institutions

REANNZ exists to meet the needs of innovation, research and academia and teaching and learning. We will continue to partner with our members to deliver solutions that add value to them where we can develop customised services, add value through aggregated pricing, create community resources that leverage our economy of scale or leverage the investment they have already made in our high-performance network infrastructure.

In the coming year REANNZ will continue to work with our member community to:

- Explore new service offerings and agree roadmaps for current services;
- Grow our cyber security services;
- Focus the value proposition of our identity and access management service portfolio;
- Ensure all services remain value-for-money.

A rich and interconnected R&E ecosystem

Grow participation in and membership of the REANNZ community, and grow the resources to which our members have access

Increased membership and access to major resources increases the value of the network as a whole (the network effect) and helps foster a productive research and education community. Our members can interact more effectively with each other, and have access to the tools and resources they need to be successful and participate in global research and education programmes.

In the coming year REANNZ will:

- Support members' access to other research and education platforms and infrastructures;
- Support our members to build capability and solve data-movement challenges within their institutions;
- Grow access to NZ datacentres and cloud service providers that are important for our members;
- Work with the global research and education network community, to ensure New Zealand remains will connected globally, and to maintain New Zealand's reputation as a highly capable and interconnected research and education system.

High-performance network platform

Deliver world-class national research and education network services to all members

Our network must remain high-performing — reliable, accurate, uncongested and able to manage the demands of often bursty research and science traffic. Keeping the network at its best requires constant planning, care and maintenance. It also requires REANNZ to remain expert in emerging technology trends, particularly the activities of the global research and education network community of which we are a part.

In the coming year REANNZ will:

- Identify and plan for REANNZ backbone capacity upgrades so that growing network use is well managed and the features of a high-performance network are maintained in a cost-effective way;
- Plan for the next generation of the REANNZ network by continually refreshing our technology and network roadmap for changes in trends, demand and technology;
- Ensure REANNZ remains across, and a part of, major technology trends and development to ensure we are well equipped to support the next generation of research and education activity.

High-performance team

REANNZ has a high performing team, with a cultural focus on quality communication, collaboration and innovation

REANNZ is an evolving organisation, diversifying our services and continuing to deepen our relationships with our members. An organisation that is high performing delivers better results for our stakeholders, will innovate more rapidly and will attract and retain the talent needed to be successful.

In the coming year REANNZ will:

- Support our team by recruiting and retaining the best talent, developing our people and aiming for excellence in leadership;
- Drive operational effectiveness by continually improving the way we operate;
- Finalise and implement REANNZ's sustainability strategy in partnership with our members and Government.

Deep understanding of our membership

To truly serve the unique needs of our community, we need to know our members' IT and research needs better than anyone

We are a member focused organisation, specialising in meeting the unique needs of our community. To do this effectively, we must have close relationships with our members, to tailor solutions and support for optimal results. Our work delivers value not only through the specialist network services that support users at individual institutions, but also through the communities of practice we foster by bringing people together across sectors and disciplines to solve research and education challenges.

In the coming year REANNZ will:

- Continue to build strong engagement with our member institutions and sector representatives, to grow our understanding of their challenges and our ability to help;
- Foster a sense of community to drive cross pollination of ideas and solutions, increase the value of the community as a whole and deepen our understanding of its needs.

Vision:

A DYNAMIC, PRODUCTIVE AND GLOBALLY CONNECTED RESEARCH, EDUCATION AND INNOVATION ECOSYSTEM FOR THE PROSPERITY OF NEW ZEALAND

Mission:

TO ENABLE NEW ZEALAND'S RESEARCH, EDUCATION AND INNOVATION SECTORS TO THRIVE IN A DATA-INTENSIVE AND DIGITALLY-ENHANCED WORLD THROUGH THE PROVISION OF TAILORED TECHNOLOGY SOLUTIONS AND HIGH-PERFORMANCE NETWORK SERVICES

PERFORMANCE FRAMEWORK

This performance framework shows how our output, the advanced network and related tools, enables research and education that leads to a strong research ecosystem and growing economy.

OUTPUT

The advanced research and education network and supporting services

Quality measures
National network availability >99.90%

International network availability >99.90%

Packet delivery >99.99999%

Quantity measures
Number of connected sites increase

New service offerings

Timeliness measures
>80% members consider any issues resolved in a timely manner

Cost-effectiveness measures
Membership base is maintained

IMPACT

Researchers across all fields are able to conduct data-intensive research

Impact measures
Total traffic flows increase 30% YoY

>80% users consider the REANNZ network essential or valuable to their work

Collaboration between science, education and innovation is enhanced

Impact measures
Total international traffic volumes increase 30% YoY

National traffic volumes increase 30% YoY

Users have access to services, content and tools they need

Impact measures
Subscriptions to services increase

OUTCOMES

Sector outcomes

Grow the New Zealand economy to deliver greater prosperity and opportunity for all New Zealanders

REANNZ outcomes

A dynamic, productive and globally connected research, education and innovation ecosystem for the prosperity of New Zealand

Outcome measures
Maintain position in top 500 Universities per GDP in the OECD Science, Technology & Industry Outlook

NZ maintains its ranking for "university-industry collaboration in R&D" in the WEF global competitiveness index

Maintain NZ ranking for "capacity for innovation" in the WEF global competitiveness index

ASSESSING OUR PERFORMANCE /

Our suite of performance indicators track trends in our high-level outcomes. Our indicators measure the impact we have and the quality, quantity, timeliness and cost-effectiveness of our output, the advanced research and education network and supporting services.

Tracking our outcomes

REANNZ is one of many contributors to a high performing and globally competitive research, education and innovation system. For this reason we track trends for this outcome using external, publicly available indicators of the performance of New Zealand's research education and innovation system, but we do not forecast specific changes in the trend indicators.

REANNZ Outcome	Trend Indicators
A dynamic, productive and globally connected research, education and innovation ecosystem for the prosperity of New Zealand.	New Zealand progresses its position in the Top 500 Universities per GDP, as shown in the OECD's "Comparative performance of national science and innovation systems", published in the OECD Science, Technology and Industry Outlook every two years.
	New Zealand maintains its ranking for 'University-Industry collaboration in R&D' in the World Economic Forum global competitiveness index.
	An improvement in New Zealand's ranking for 'capacity for innovation' in the World Economic Forum global competitiveness index.

Forecasting and measuring our impacts

Impact: Researchers across all fields are able to conduct data-intensive research

A number of science initiatives with large data requirements are being conducted that could not occur without the reach, reliability and speed of an advanced network. Examples include high-performance computing applications in research, for example climate and geological science, facilitated by the National eScience Infrastructure project (NeSI), genomics work with international collaborators and radio astronomy data analysis related to the international SKA project. All of these involve scientific instruments that generate massive datasets. These datasets need to be transported quickly and accurately from the instruments to hosting or processing centres, and to be shared across the globe with scientists and researchers.

Indications of the amount of data-intensive science occurring are represented by the amount of data flowing over the network, as well as our users' assessment of the need for the network.

Able to conduct data-intensive science & research	Actual 2012/13	Actual 2013/14	Actual 2014/15	Actual 2015/16	Estimate 2016/17	Forecast 2017/18
Total traffic flows increase	+ 1.47 PB[2] (28%)	+ 3.12 PB (46%)	+ 8.3 PB (84%)	+ 9.37 PB (52%)	+ 11.93 PB (50%)	+ 30% YoY growth
Total traffic	6.75 PB	9.87 PB	18.17 PB	27.54 PB	41.40 PB	

Increases in the total amount of traffic flowing over the network indicate more research and education services, applications and collaboration is being conducted and supported.

The GÉANT compendium for 2015, which consolidates information from European and other participating NRENs, reported that the compound annual growth rate over the last 10 years for research and education network's IP traffic averaged around 30%. We have set target for 2017/18 to reflect this international benchmark.

Measure	Actual 2014/15	Actual 2015/16	Estimate 2016/17	Forecast 2017/18
Total traffic destined for other research and education networks	+37% +0.28 PB	+7% +0.07 PB	0% No change	+5% +0.06%
Total traffic	1.04 PB	1.11 PB	1.11 PB	1.17 PB

What this measures

Increases in the total amount of traffic flowing internationally between REANNZ members and the members of global NRENs, coupled with an understanding of the traffic profile, are together indicators of the value of our international NREN partnerships, and how they are used to facilitate inter-institutional collaboration.

This measure does not include research and education activity that utilises other research and education services, for example Amazon Web Services or Microsoft Azure (which include activities such as computing, storage and analytics). Growing use of these services are captured in our total international traffic volumes, shown later on in this report.

Our forecast

A vibrant research environment produces and shares more and more data with collaborators internationally, and sources data from global repositories and instruments. We have forecast a 5% growth in traffic volumes for this measure in the next year. This recognises the growth we would expect to see as a result of:

- Increases in international research and collaboration due to the growth in MBIE's Endeavour Fund that targets such areas;
- The establishment of a new genomics platform, through the Statement of Science Investment Fund.

Continued growth is reliant on:

- Changes in the incentives for researchers and institutions to undertake data-intensive research programmes with international participants and/or use of international research infrastructures, and
- Increases in the capability (both technology and skills) of our members to support the transfer of data inside their institutions.

2 Petabytes (PB). One petabyte is equal to 1,000 terabytes or 1,000,000 gigabytes.

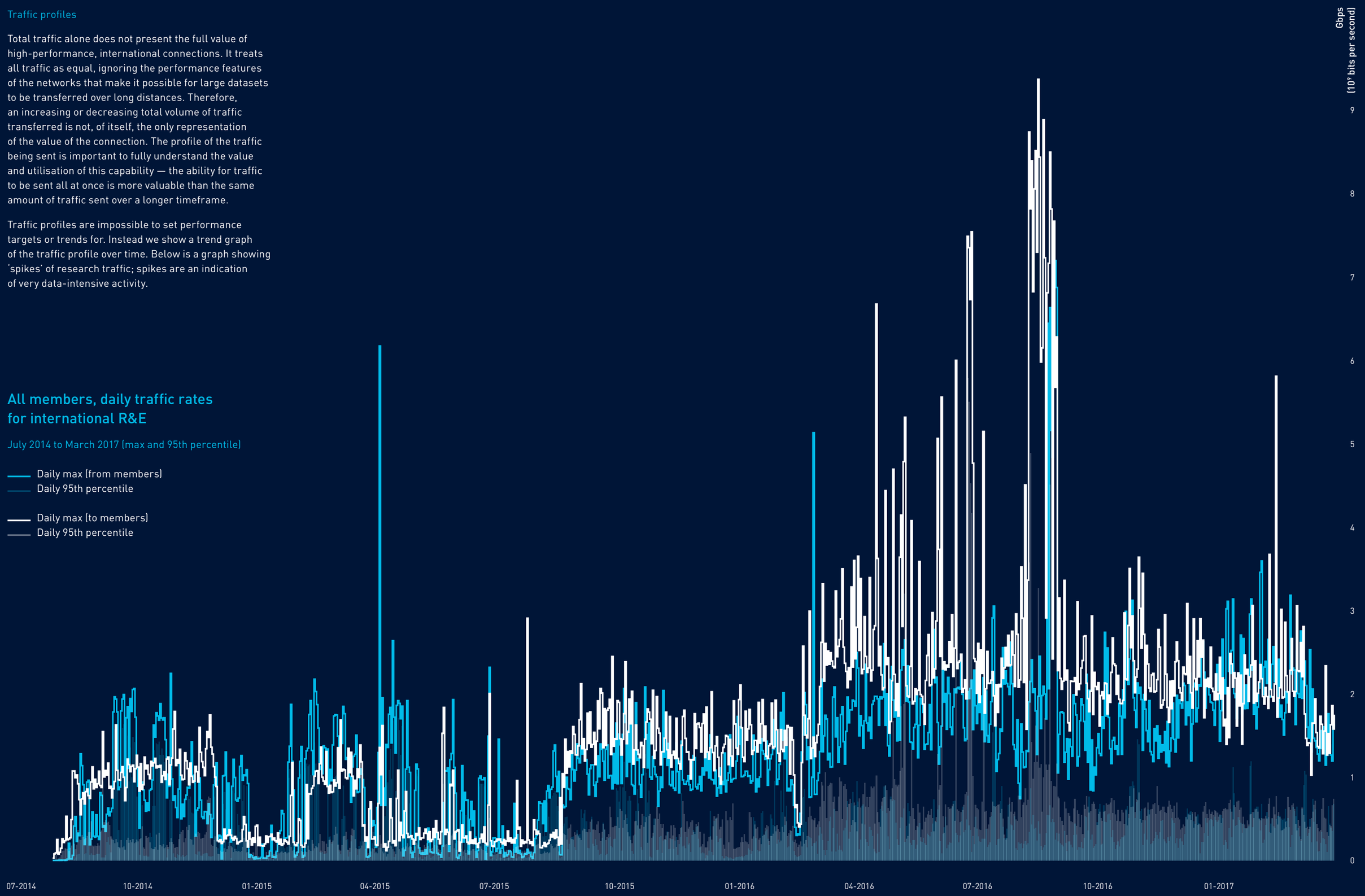
Traffic profiles

Total traffic alone does not present the full value of high-performance, international connections. It treats all traffic as equal, ignoring the performance features of the networks that make it possible for large datasets to be transferred over long distances. Therefore, an increasing or decreasing total volume of traffic transferred is not, of itself, the only representation of the value of the connection. The profile of the traffic being sent is important to fully understand the value and utilisation of this capability — the ability for traffic to be sent all at once is more valuable than the same amount of traffic sent over a longer timeframe.

Traffic profiles are impossible to set performance targets or trends for. Instead we show a trend graph of the traffic profile over time. Below is a graph showing 'spikes' of research traffic; spikes are an indication of very data-intensive activity.

All members, daily traffic rates for international R&E

July 2014 to March 2017 (max and 95th percentile)



	Actual 2012/13	Actual 2013/14	Actual 2014/15	Actual 2015/16	Estimate 2016/17	Forecast 2017/18
Users consider the REANNZ network essential to their work	44%	69%	74%	80%		
Users consider the REANNZ network valuable to their work	32%	25%	25%	16%		
Total	76%	94%	99%	96%	>80%	>80%

As the capability of our end users to undertake data-driven research, and the areas which rely on complex data sets or instrumentation have increased, so too has the importance of being able to store, share and analyse that data. Over the last four years the services we provide have become increasingly critical to our users, with year-on-year increases in those who have said the network is essential to the work they do. We expect to maintain a result over 80% in the coming and following years.

Impact: Collaboration between science, innovative business and education sectors is enhanced

Collaboration takes many forms: it can be as simple as having a conversation over a videoconference, or as complex as the multistep process of turning one scientist's research project into a commercial product. REANNZ enables these collaborations by providing the connectivity and tools to make collaboration easier and more effective.

International and national traffic is an indirect indicator of the amount of collaboration enabled by REANNZ.

Enhanced collaboration	Actual 2013/14	Actual 2014/15	Actual 2015/16	Estimate 2016/17	Forecast 2017/18
International traffic volume	+95% +1.17 PB	+143% +3.43 PB	+85% +4.95 PB	+29% +3.08 PB	+30% YoY Growth
Total traffic	2.4 PB	5.83 PB	10.78 PB	13.86 PB	
National traffic volume	+35% +1.94 PB	+65% +4.87 PB	+36% +4.42 PB	+64% +10.78 PB	+30% YoY Growth
Total traffic	7.47 PB	12.34 PB	16.76 PB	27.54 PB	

Increasing amounts of traffic flowing through our network indicate that more collaboration with both national and international participants is taking place. REANNZ has experienced exceptional growth over the last few years as upgrades were put in place. From next year, we expect this to moderate nearer to 30% annual growth, benchmarked against international research and education networks.

Impact: Users have cost-effective access to the content and tools they need

REANNZ continues to develop services that meet the unique needs of our members, across research and academia and teaching and learning.

We partner with our members to deliver services that add value by:

- Leveraging the investment made in our high performance network infrastructure
- Developing customised solutions where there is a unique need with a solution not available in the market
- Procuring third party services where we can add value through aggregated pricing, better terms, interoperability and support
- Creating communal resources that can leverage or create an economy of scale for our member community.

Today, such services include eduroam™, Tuakiri identity and access management, security services, technical advisory services, managed network services, high-quality internet, caching, cloud and data centre connectivity. These additional service offerings help improve the productivity and capability of our members, leveraging our existing infrastructure and talent and creating an even stronger value proposition.

Cost-effective access to content and tools	Restated actual 2013/14	Restated actual 2014/15	Restated actual 2015/16	Restated estimate 2016/17	Restated forecast 2017/18
Subscriptions to services increase	+39%	+75%	+51%	+19%	+15%
	53 subscriptions	93 subscriptions	140 subscriptions	166 subscriptions	191 subscriptions

We have adjusted our methodology to better reflect in substance the uptake in our services and the overall number of subscriptions.

This measure demonstrates REANNZ's ability to deliver services that are relevant and value-for-money to our members. It compares the number of members subscribed to REANNZ services at the start of the year, with the number of members subscribed to REANNZ services at the end of the year.

Monitoring our output

Output: The advanced research and education network and supporting services

REANNZ benchmarks and monitors the performance of our network on the dimensions of quality, quantity, timeliness and cost-effectiveness.

Quality

	Actual 2012/13	Actual 2013/14	Actual 2014/15	Actual 2015/16	Estimate 2016/17	Target 2017/18
National network availability	99.96% 12 month rolling average	99.99% 12 month rolling average	99.99% 12 month rolling average	99.99% 12 month rolling average	99.99% 12 month rolling average	99.90% 12 month rolling average
International network availability	99.87% 12 month rolling average	99.93% 12 month rolling average	100.00% 12 month rolling average	100.00% 12 month rolling average	99.99% 12 month rolling average	99.99% 12 month rolling average

National and international network availability measures the reliability of the network. Network downtime includes faults and other connectivity or hardware outages, but excludes planned maintenance outages. 99.90% network availability is standard for research and education networks internationally. Our goal is to maintain this high level of reliability. REANNZ aims for network reliability to be as high as reasonably possible, given the need to balance the costs associated with each magnitude increase in network reliability.

	Estimate 2016/17	Target 2017/18
Packet delivery	99.999999%	99.9999%

Packet delivery is the successful transfer of a packet of data from point A, to point B. Poorly tuned networks, networks that are experiencing hardware or software faults or networks that are congested will drop packets. This directly effects the quality of the user experience and the integrity of the information transferred.

Commercial vendors accept packet loss. The amount that is acceptable depends on the type of traffic being sent. As an example, many consider 1–2.5% packet loss "acceptable" for streaming video. This manifests as buffering, skipping or out-of-sync audio.

However, a major differentiator of research and education networks is our aim to eliminate packet loss as it is catastrophic for large data transfers typical of our user groups. We set our packet delivery targets well beyond the levels of an ordinary telecommunications provider.

For example, a 100 Terabyte dataset transferred over a dedicated, 10Gbps connection with 0% packet loss takes 1 day to transfer. If you suffered only 0.002% packet loss, the transfer could stretch out to 215 days — making work impossible.

Because of this, packet delivery is a key element of network quality and one of the defining features of research and education networks. Each additional decimal place has an exponentially positive impact on the ability for data-intensive work to be done.

Quantity

The number and size of our members' network connections demonstrate the quantity of the services we provide. Adding new services is another measure of providing an increasing quantity of services to our members.

	Actual 2013/14	Actual 2014/15	Actual 2015/16	Estimate 2016/17	Target 2017/18
Volume of member connections (number of sites x size of connection)	+46% +82 Gb	+45% +116 Gb	+73% +274 Gb	+33% +444 Gb	+15% +163 Gb
Total	259Gb	375Gb	649Gb	1093Gb	1256Gb

The volume of member connections is a calculation based on the number of member connections to the network and their size. The more members, and the larger the size of their connection, the more use our network supports. The quantity we provide will grow as our members increase the size of their connections to meet increased demand, as they implement second connections to our network for resiliency, and as we add new members and connect new sites to the network.

This measure reflects the capability that REANNZ supports, rather than actual usage or traffic growth. Traffic or use is expected to grow at 30% per annum, as our members better utilise their current connections to the network. As this growth is realised, the size and/or number of connections members need to perform their science will increase and this measure will grow, albeit more slowly over time as it takes members who upgraded from 1Gbps to 10Gbps time to grow their traffic needs above 10Gbps.

New services added	Actual 2014/15	Actual 2015/16	Estimate 2016/17	Target 2017/18
Service offerings increase	Not achieved	Data Centre Connect services to members	One security service added	One new service added

REANNZ is working with members to develop service offerings that support improved security and access to cloud services. We are also focused on improving the effectiveness of existing services such as Tuakiri and eduroam™.

Timeliness

Member survey of helpdesk users	Actual 2013/14	Actual 2014/15	Actual 2015/16	Estimate 2016/17	Forecast 2017/18
Users consider reported issues to be resolved in a timely manner	84%	100%	100%	80%	80%[3]

The speed at which we identify and resolve faults and other network performance issues is not only a measure of the quality of our customer service, but also a measure of the timeliness of our network management activity. We actively manage the network to identify issues before they affect our members, and proactively advise of issues rather than simply being reactive to member calls.

As well as this, the REANNZ helpdesk logs incident reports from users. Although we have target resolution times agreed with our suppliers and are in most cases able to resolve transfer or performance issues ourselves, the true test of our timeliness is our members' opinion of our responsiveness to their challenges.

Cost-effectiveness

The cost-effectiveness of the REANNZ network for our members is best demonstrated by retaining our core membership base and growing overall membership. If we are not cost-effective in providing valuable networking solutions, alternative suppliers would enter the market, and we would lose members.

Cost-effectiveness for members	Actual 2013/14	Actual 2014/15	Actual 2015/16	Estimate 2016/17	Target 2017/18
REANNZ maintains its core membership base	8/8 Universities	8/8 Universities	8/8 Universities	8/8 Universities	8/8 Universities
	7/7 CRIs	7/7 CRIs	7/7 CRIs	7/7 CRIs	7/7 CRIs
	1/1 ATI	1/1 ATI	1/1 ATI	1/1 ATI	1/1 ATI
	11/18 ITPs	12/18 ITPs	12/15 ITPs	12/15 ITPs	12/15 ITPs
	1/3 Wānanga	1/3 Wānanga	1/3 Wānanga	1/3 Wānanga	1/3 Wānanga
Total members	34	37	42	44	46

REANNZ addresses a niche market that commercial networks cannot — the provisioning of the unique services that meet the needs of science, research and education. Comparisons of cost with commercial telecommunications providers are misleading, as not only is our network designed to support time-sensitive and bursty traffic flows globally, but the network has other performance attributes, such as very high packet delivery thresholds and low latency and jitter, which commercial networks are not designed to support.

Our target for 2017/18 is to maintain our core membership base.

While a new strategic investment under the SSIF of $3 million per annum has been agreed by Government, REANNZ and its members must address the $1 million per annum that is still required to achieve a sustainable financial position. Should agreement not be able to be reached on the best way to achieve this, there is a substantial risk that REANNZ will lose members.

As an infrastructure-intensive organisation with a high fixed cost base, REANNZ is particularly sensitive to the loss of core members, leading to a high risk of business failure.

3 Our target of 80% of responses resolved in a timely manner represents an appropriate balance between responsiveness and the cost of resourcing to increase responsiveness. Falling below this target would indicate that we had not adequately resourced the helpdesk facility.

Expected revenues and proposed expenses

Output: The advanced research, education and innovation network and related tools

	2017/18 $000
Revenues	
Crown grant for Hawaiki cable	5,250
Strategic Science Investment Fund	3,000
Network revenue	8,000
Other revenue	4,926
Total revenue	**21,176**
Expenses	
Amortisation and depreciation	2,744
Network expenses	11,700
Operating expenses	4,821
Total expenditure	**19,265**
Surplus/(Deficit)	**1,911**

PROSPECTIVE FINANCIAL STATEMENTS /

Prospective Statement of Comprehensive Revenue and Expense

For the year ending 30 June

FORECAST 2017 $000		2018 $000	2019 $000	2020 $000
	Revenue			
	Grant revenue			
4,000	Crown Funding Agreement	–	–	–
5,250	Hawaiki contribution	5,250	3,000	–
–	Strategic Science Investment Fund	3,000	3,000	3,000
	Network revenue			
7,867	Membership fees	8,000	8,152	8,308
–	Required Network Contribution	–	1,000	1,020
3,808	Other revenue	4,362	5,066	5,872
748	Interest revenue	564	312	271
21,673	**Total Revenue**	**21,176**	**20,530**	**18,471**
	Network Expenses			
1,827	Depreciation and amortisation	2,421	2,926	3,162
1,670	Employment expenses	2,423	2,473	2,523
6,919	Network operating expenses	9,276	13,554	9,273
10,416	**Total Network Expenses**	**14,120**	**18,953**	**14,958**
11,257	**Gross Surplus / (Loss)**	**7,056**	**1,577**	**3,513**
	Less:			
	Operating Expenses			
32	Audit	33	34	34
186	Depreciation and amortisation	324	365	338
89	Directors fees	122	125	127
1,956	Employment expenses	2,089	2,142	2,184
1,051	Other operating expenses	1,337	1,293	1,178
694	Professional services	584	456	357
181	Operating leases	256	256	256
252	Travel expenses	400	391	399
4,441	**Total Operating Expenses**	**5,145**	**5,062**	**4,873**
6,816	**Surplus / (Deficit) excluding gains / (losses)**	1,911	**(3,485)**	**(1,360)**
(622)	Foreign currency gains / (losses)	–	–	–
6,194	**Surplus / (Deficit)**	1,911	**(3,485)**	**(1,360)**
–	Other comprehensive revenue	–	–	–
6,194	**Total Comprehensive Revenue and Expense**	**1,911**	**(3,485)**	**(1,360)**

The Statement of Significant Assumptions and Notes to the Prospective Financial Statements form part of and are to be read in conjunction with these financial statements

Prospective Statement of Financial Position

As at 30 June

FORECAST 2017 $000		2018 $000	2019 $000	2020 $000
	ASSETS			
	Current Assets			
3,848	Cash and cash equivalents	4,300	4,209	4,129
10,378	Funds held in escrow[4]	3,774	–	–
2,928	Receivables and debtors	3,051	3,302	3,424
20,300	Investments	11,300	7,300	8,300
615	Derivative financial instruments	531	121	–
398	Prepayments	115	265	230
388	Prepaid network expenses	1,290	1,542	1,511
38,855	**Total Current Assets**	**24,361**	**16,739**	**17,594**
	Non-Current Assets			
13,037	Property, plant and equipment	16,436	15,224	13,015
652	Derivative financial instruments	121	–	–
8,982	Prepaid network expenses	17,634	20,274	19,171
22,671	**Total Non-Current Assets**	**34,191**	**35,498**	**32,186**
61,526	**Total Assets**	**58,552**	**52,237**	**49,780**
	LIABILITIES			
	Current Liabilities			
1,656	Accounts payable and accrued expenses	1,988	2,027	685
135	GST payable	141	206	366
144	Employee entitlements	144	144	144
2,812	Revenue in advance	2,906	2,989	3,091
5,250	Deferred revenue	3,000	–	–
17	Deferred lease incentive	17	17	17
10,014	**Total Current Liabilities**	**8,196**	**5,383**	**4,303**
	Non-Current Liabilities			
3,050	Deferred revenue	–	–	–
64	Deferred lease incentive	47	31	14
3,114	**Total Non-Current Liabilities**	**47**	**31**	**14**
13,128	**Total Liabilities**	**8,243**	**5,414**	**4,317**
48,398	**Net Assets**	**50,309**	**46,823**	**45,463**
	EQUITY			
16,001	Contributed capital	16,001	16,001	16,001
32,397	Accumulated surplus / (deficit)	34,308	30,822	29,462
48,398	**Total Equity**	**50,309**	**46,823**	**45,463**

4 Funds held in escrow relate to the remaining portion of the initial deposit amount for the Hawaiki international cable held in USD. This amount includes unrealised gains or losses recorded in the Statement of Comprehensive Revenue and Expense arising from translation of the balance into NZD. As USD milestone payments are made from the escrow account they are recognised as a prepaid asset in NZD and will be amortised over the life of the service contract from the ready for service date.

The Statement of Significant Assumptions and Notes to the Prospective Financial Statements form part of and are to be read in conjunction with these financial statements

Prospective Statement of Cash Flows

For the year ending 30 June

FORECAST 2016 $000		2017 $000	2018 $000	2019 $000
	CASH FLOWS FROM OPERATING ACTIVITIES			
	Cash was provided from (applied to)			
4,000	Receipts from the Crown	–	–	–
–	Strategic Science Investment Fund	3,000	3,000	3,000
8,063	Network revenue	8,242	8,399	8,560
–	Required network contribution	–	917	1,018
926	Interest revenue	564	312	271
3,252	Other revenue	4,057	4,767	5,617
92	GST (net)	907	461	140
(11,380)	Payments to suppliers and employees	(15,040)	(16,838)	(13,755)
(6,449)	Prepayments for network connectivity	(9,943)	(6,220)	(2,446)
(1,496)	**Net Cash Flow from Operating Activities**	**(8,213)**	**(5,202)**	**2,405**
	CASH FLOWS FROM INVESTING ACTIVITIES			
	Cash was provided from (applied to)			
(1,970)	Purchase of plant and equipment	(6,939)	(2,663)	(1,485)
6,449	Funds deposited in escrow	6,604	3,774	–
(2,278)	Term deposit investments	9,000	4,000	(1,000)
2,201	**Net Cash Flow from Investing Activities**	**8,665**	**5,111**	**(2,485)**
	CASH FLOWS FROM FINANCING ACTIVITIES			
	Cash was provided from (applied to)	–	–	–
–	**Net Cash Flow from Financing Activities**	**–**	**–**	**–**
705	**Net (Decrease)/Increase in Cash Held**	**452**	**(91)**	**(80)**
3,143	Cash at beginning of year	3,848	4,300	4,209
3,848	**Cash at End of Year**	**4,300**	**4,209**	**4,129**
	Represented by:			
3,848	**Cash at Bank**	**4,300**	**4,209**	**4,129**

The Statement of Significant Assumptions and Notes to the Prospective Financial Statements form part of and are to be read in conjunction with these financial statements

Nature and Purpose of Prospective Financial Statements

The prospective financial statements have been prepared to the best of our knowledge and belief as an indication of REANNZ's future financial performance. Actual financial results achieved for the period covered may vary from the information presented, potentially in a material manner.

The purpose of the prospective financial statements is to inform readers of this Statement of Performance Expectations of REANNZ's best estimate of its future financial performance at the date of publication, and to comply with REANNZ's specific reporting and disclosure obligations. The statements may not be suitable for other purposes.

Statement of Significant Assumptions

The prospective financial statements have been prepared on the basis of the following key assumptions:

Revenues

In June 2017 REANNZ received confirmation from the Minister of Science and Innovation, Hon Paul Goldsmith, that Government will make a new, strategic investment in REANNZ of $3 million per year. The investment will focus on the purchase of specialist services and activities that enable cost-effective research and high-performance science applications, that are not readily available or cost-effective through other telecommunications providers. This funding will come from the Strategic Science Investment Fund (SSIF).

REANNZ is now working with the Ministry of Business, Innovation and Employment to agree the specifics of this new investment, including the key performance indicators by which success will be measured. Indications are that the term of the funding will be aligned with the seven-year investment timeframe under the SSIF.

We also need to address the $1 million per annum funding shortfall that we still face. REANNZ will self-fund the one-year shortfall for 2017/18, and we have assumed that we will reach agreement on how to fund this over the medium term, with a $1 million per annum "network contribution" forecast from the 2018/19. This remains a critical business risk, and we intend to make sure that the opportunities to address this are fully canvassed and explored with our members, to ensure we continue to grow the value proposition relevant to our member stakeholder groups.

This provides REANNZ with the opportunity to work with our stakeholders to review and update our overall core network services model, so it remains relevant and competitive for our various members' future national and international research, education, internet and enterprise needs.

Other than annual CPI adjustments, no membership fee increases have been forecast on the basis any increases in fees at this stage, without a revised model, creates a risk for REANNZ of members withdrawing their membership. Our business model is currently reliant on all members remaining part of the community due to our limited ability to work with new members to replace lost revenue. The withdrawal of a member would mean fees would have to increase for the remaining members, potentially creating a self-fulfilling cycle of exit and fee increases from which we would not be able to recover.

The Statement of Significant Assumptions and Notes to the Prospective Financial Statements form part of and are to be read in conjunction with these financial statements

No major changes to REANNZ's membership revenue base are forecast, as REANNZ has already connected the most significant New Zealand research and education organisations allowable under our mandate. While we pursue opportunities with other research, education and innovation organisations that have high-performance or data-intensive needs, these are not expected to be at a scale or price point that would generate a significant revenue contribution.

REANNZ continues to explore opportunities to grow and improve its product and service offering to members. Revenues and costs from a growing managed services portfolio have been included in the forecasts. New service opportunities will be included in REANNZ's forecasts as business cases are developed and the nature and scope of new services are known.

Network expenditure

Provision has been made over the next two years to upgrade the national network from 20Gbps capacity to 100Gbps, in line with increasing backbone utilisation rates.

REANNZ is an anchor tenant on a new submarine cable system. The initiative supports the government's policy objective of encouraging an alternative international cable to New Zealand for the purpose of telecommunications market competition, and secures REANNZ's growing international capacity needs over the long term at affordable prices. This cable is expected to be in service by September 2018, and costs associated with the service will be recognised from this date.

REANNZ is the vehicle for Crown support of a new submarine cable, through the allocation of a $15M grant received from Vote Communications. The Crown grant will be recognised as revenue in line with key milestone payments made during the construction of the cable. One payment is forecast to be made during the 2017/18 financial year, with the last payment on ready for service in September 2018.

Forward cash projections

REANNZ owns and operates infrastructure to deliver its high-performance network services. As with most infrastructure-based businesses, REANNZ operates on medium-to long-term infrastructure investment cycles.

To support the periodic investment in this infrastructure, REANNZ's business model requires the accumulation of cash reserves. Major network reinvestment points include:

- the shift to Hawaiki Submarine Cable Limited partnership as our new international cable provider, forecast to be ready for service in the 2018/19 financial year. This includes assumptions about maximum international capacity demand and the cost of appropriate resiliency options; and
- the renewal of national network infrastructure which will be required in 2022/23, as the useful life of existing infrastructure and the associated operating agreements expire. Assumptions about the scale and cost of the replacement have been made, and given the dynamic nature of the telecommunications market actual requirements may vary significantly from the estimates shown.

Exchange rate sensitivity

The following graph shows the impact of USD:NZD exchange rate movements on our cash balances over a 10-year period. The bold blue line shows the 10-year cash forecast based on the 2017/18 budget and assumes an exchange rate of USD 0.65: NZD 1. The additional lines illustrate our exposure to foreign currency risk with the 2017/18 budget cash balances re-stated with exchange rate movements in a range of +/- 10c from the base exchange rate.

The graph takes into consideration the new Strategic Science Investment Fund investment of $3 million per year and is based on the assumption that a $1 million per annum contribution from stakeholders has been agreed for the full 2018/19 year and ongoing.

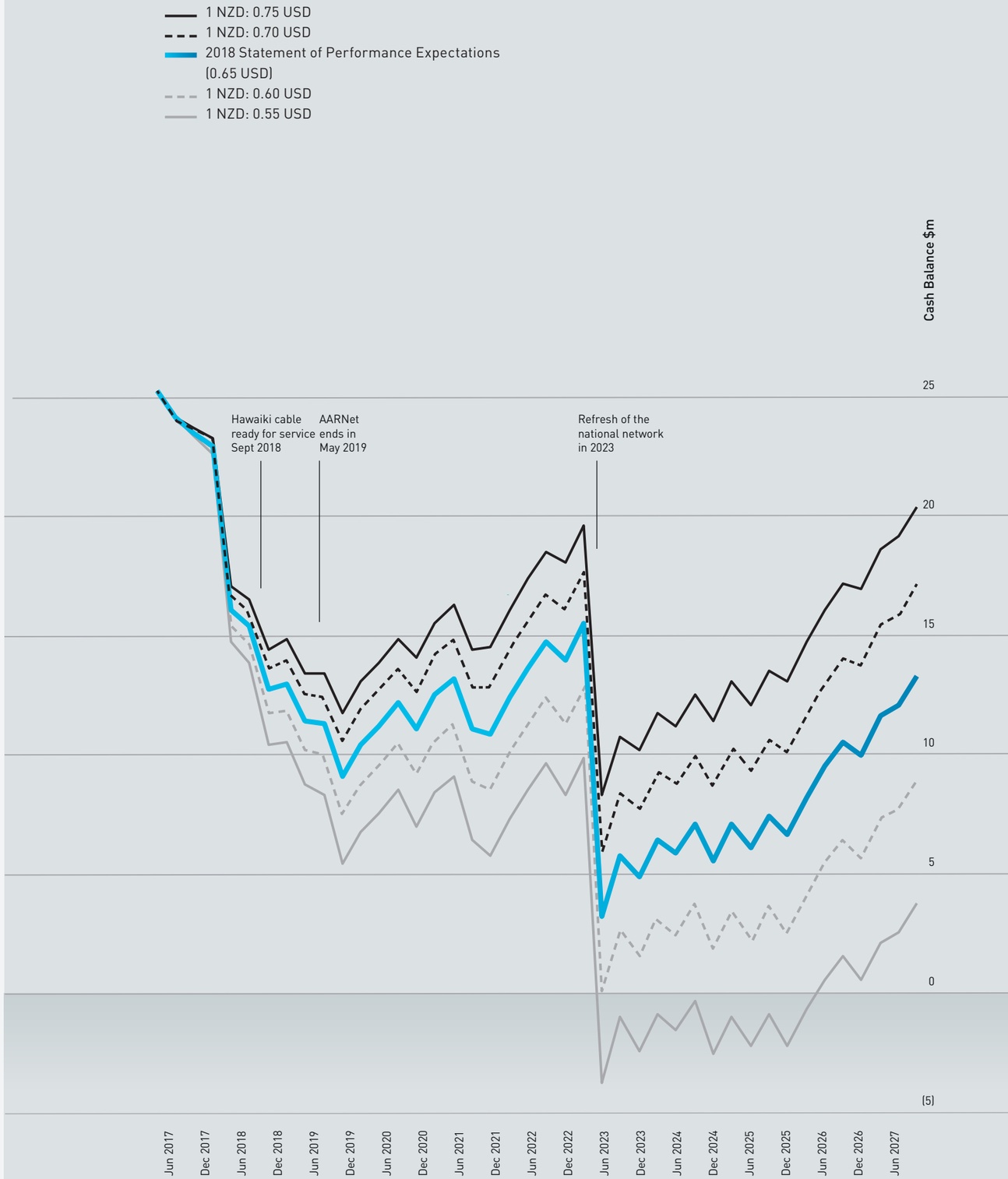
Major capital expenditure as well as costs associated with the Hawaiki cable are denominated in USD. To minimise exchange rate exposure, forward contracts to purchase USD will be entered into.

The projection demonstrates the minimum cash balances required to manage exchange rate variances over the medium to long term.

The Statement of Significant Assumptions and Notes to the Prospective Financial Statements form part of and are to be read in conjunction with these financial statements

Exchange rate sensitivity

Measured in millions of NZ dollars



Notes to the Prospective Financial Statements

The reporting entity is Research and Education Advanced Network New Zealand Limited ("REANNZ"), a Crown entity as defined by the Crown Entities Act 2004 and a New Zealand incorporated company. As a Crown entity, REANNZ's ultimate parent is the New Zealand Crown.

REANNZ's primary objective is to establish, own and operate a high-speed data network for the research and education sector. As such, REANNZ's aim is to provide services for the ultimate benefit of the New Zealand public, rather than make a financial return.

Accordingly, REANNZ has designated itself as a public benefit entity ("PBE") for the purposes of Public Benefit Entity (PBE) accounting standards with reduced disclosures.

Basis for preparation

Statement of compliance

The prospective financial statements have been prepared in accordance with Crown Entities Act 2004 and with generally accepted accounting practice in New Zealand (NZ GAAP).

These prospective financial statements comply with PBE accounting standards, that includes PBE FRS 42 Prospective Financial Statements.

REANNZ elected to report in accordance with Tier 2 PBE Accounting Standards with reduced disclosure requirements and is eligible to report as a Tier 2 reporting entity on the basis that it does not have public accountability and is not large.

Presentation and rounding

The prospective financial statements are presented in New Zealand dollars, rounded to the nearest thousand ($000). The functional currency of REANNZ is New Zealand dollars.

Significant accounting policies

Accounting policies are selected and applied in a manner that ensures that the resulting financial information satisfies the concepts of relevance and reliability. REANNZ accounting policies, therefore, are designed to report the substance of the underlying transactions undertaken by the entity.

The following significant accounting policies have been adopted in the preparation and presentation of the prospective financial statements:

Revenue

The specific accounting policies for significant revenue items are explained below:

Grant revenue

REANNZ is funded in part by the Crown. Where a grant is provided to partially fund the operation of a high-speed communication network for the research and education sector, REANNZ considers there are no conditions attached, and the grant is recognised as revenue at the point of entitlement.

Other grants are recognised as revenue when they become receivable unless there is an obligation in substance to return the funds if conditions of the grant are not met. If there is such an obligation, the grants are initially recorded as deferred revenue in the Statement of Financial Position, and recognised as revenue when conditions of the grant are satisfied.

Network and other revenue

Revenue is measured at the fair value of the consideration received or receivable. All transactions are exchange transactions.

Interest revenue

Interest revenue is recognised by accruing the interest due for the investment on a time proportion basis.

Foreign currency transactions

Transactions in foreign currencies, including those for which forward foreign exchange contracts are held, are translated to New Zealand dollars (the functional currency) at the spot rate on the date of transaction.

Foreign exchange gains and losses resulting from the settlement of such transactions and from the translation at year end exchange rates of monetary assets and liabilities denominated in foreign currencies are recognised in the Statement of Comprehensive Revenue and Expense.

Operating leases

An operating lease is a lease that does not transfer substantially all the risks and rewards incidental to ownership of an asset to the lessee. Lease payments under an operating lease are recognised as an expense on a straight-line basis over the lease term.

Lease incentives received are recognised in the Statement of Comprehensive Revenue and Expense as a reduction of rental expense over the lease term.

Where the leased items are not in use, the operating lease payments will be treated as a prepayment in the Statement of Financial Position. Once the items begin to be used in deriving revenue, these prepayments are released to the Statement of Comprehensive Revenue and Expense on a straight-line basis over the period of the remaining operating lease term.

Finance leases

A finance lease is a lease that transfers to the lessee substantially all the risks and rewards incidental to ownership of an asset, whether or not title is eventually transferred.

At the commencement of the lease term, prepaid finance leases where REANNZ is the lessee are recognised as an asset in the Statement of Financial Position at the fair value of the leased item.

The amount recognised as an asset is depreciated over its useful life. If there is no reasonable certainty as to whether REANNZ will obtain ownership at the end of the lease term, the asset is fully depreciated over the shorter of the lease term and its useful life.

Receivables

Accounts receivable are recognised at fair value. A provision for impairment of accounts receivable is made where there is objective evidence that REANNZ will not collect all amounts due according to the original terms of the receivable. When this occurs, the receivable is recorded at amortised cost, less provision for impairment. When the receivable is uncollectible, it is expensed in the Statement of Comprehensive Revenue and Expense.

Investments

Bank term deposits

Investments in bank term deposits are initially measured at the amount invested. Interest is subsequently accrued and added to the investment balance.

Derivative financial instruments

REANNZ enters into derivative financial instruments, including forward foreign exchange contracts, as part of its normal operations to manage its exposure to foreign exchange rate risk. REANNZ does not hold or issue derivatives for trading purposes. REANNZ has not adopted hedge accounting.

Derivatives are initially recognised at the fair value on the date a derivative contract is entered into and are subsequently revalued at each balance date, with the resulting gain or loss recognised in the Statement of Comprehensive Revenue and Expense.

A forward foreign exchange derivative is classified as current if the contract is due for settlement within 12 months of balance date. Otherwise the full fair value of forward foreign exchange derivatives are classified as non-current.

Property, plant and equipment

Property, plant and equipment asset classes consist of six classes, which are measured as follows:

- Leasehold improvements, at cost less accumulated depreciation and impairment losses.
- Routers, switches and optical equipment, at cost less accumulated depreciation and impairment losses.
- Information technology equipment, at cost less accumulated depreciation and impairment losses.
- Office equipment, at cost less accumulated depreciation and impairment losses.
- PoP equipment, at cost less accumulated depreciation and impairment losses.
- Fibre and fibre housing, at cost less accumulated depreciation and impairment losses.

Additions

The cost of an item of property, plant and equipment is only recognised as an asset when it is probable that future economic benefits or service potential associated with the item will flow to REANNZ and the cost of the item can be measured reliably.

Work in progress is recognised at cost less impairment and is not depreciated.

In most instances, an item of property, plant and equipment is initially recognised at cost. Where an asset is acquired through a non-exchange transaction, the asset will be recorded at fair value at the date of acquisition.

Costs incurred subsequent to initial acquisition are capitalised only when it is probable that future economic benefits or service potential associated with the item will flow to REANNZ and the cost of the item can be measured reliably.

The Statement of Significant Assumptions and Notes to the Prospective Financial Statements form part of and are to be read in conjunction with these financial statements

Research and Education Advanced Network New Zealand Limited

The costs of servicing property, plant and equipment are recognised in the Statement of Comprehensive Revenue and Expense as they are incurred.

Disposals

Gains and losses on disposals are determined by comparing the proceeds of disposal with the carrying amount of the asset. Gains and losses on disposal are included in the Statement of Comprehensive Revenue and Expense.

Depreciation

Depreciation on property, plant and equipment (excluding work in progress) is calculated on a straight-line basis, from the time the asset is in the location and condition necessary for its intended use. This basis allocates the cost or value of the asset, less its residual value, over its estimated useful life.

The depreciation method, estimated useful lives and residual values of property, plant and equipment are reviewed annually to assess appropriateness.

The following estimated useful lives are used in the calculation of depreciation:

Leasehold improvements	6 years
Routers, switches and optical equipment	3–8 years
Information technology equipment	3 years
Office equipment	5 years
PoP equipment	8 years
Fibre and fibre housing	20 years

Leasehold improvements are depreciated on the basis of estimated useful life or the remaining lease term, whichever is shorter.

Intangible assets

Software is a finite life intangible and is recorded at cost less accumulated amortisation and impairment. Amortisation is charged on a straight-line basis over the estimated useful life of the intangible asset.

Costs associated with maintaining computer software are recognised as an expense when incurred.

Staff training costs are recognised as an expense when incurred.

Costs associated with the development and maintenance of the REANNZ website are recognised as an expense when incurred.

The useful life and associated amortisation rates of major classes of intangible assets have been estimated as follows:

Software	3 years

Impairment of property, plant and equipment and intangible assets

REANNZ does not hold any cash-generating assets. Assets are considered cash-generating where their primary objective is to generate a commercial return.

Non-cash generating assets

At each reporting date, assets are reviewed by the directors to determine whether there are any events or changes in circumstances that indicate that carrying amounts may not be recoverable. An impairment loss is recognised as the amount by which the asset's carrying amount exceeds its estimated recoverable amount.

If the carrying amount of an asset exceeds its recoverable amount, the asset is impaired and the carrying amount is written down to the recoverable amount. The impairment loss is then recognised as an expense in the Statement of Comprehensive Revenue and Expense.

Where an item of property, plant or equipment has been revalued, any impairment loss is recognised against the revaluation reserve for that class of asset. Where this results in a debit balance in the revaluation reserve, the balance is recognised in the Statement of Comprehensive Revenue and Expense.

Any reversal of an impairment loss is recognised in the Statement of Comprehensive Revenue and Expense. Impairment losses can only be reversed to the extent that the carrying amount of the asset matches the carrying amount as calculated under the cost less accumulated depreciation method.

For items of property, plant or equipment that have been re-valued, any reversal of impairment loss is credited back to the revaluation reserve. However, to the extent that an impairment loss for that class of asset was previously recognised in the Statement of Comprehensive Revenue and Expense, a reversal of impairment loss is also recognised in the Statement of Comprehensive Revenue and Expense.

Payables

Short term payables are recorded at the amount payable.

Employee entitlements

Employee benefits due to be settled within 12 months after the end of the year in which the employee provides the related service are measured based on the accrued entitlements at current rates of pay. These include salaries and wages accrued up to balance date, annual leave earned but not yet taken at balance date.

A liability and an expense are recognised for bonuses where there is a contractual obligation or where there is a past practice that has created a constructive obligation and a reliable estimate of the obligation can be made.

Cash flow statement

The prospective Statement of Cash Flows is prepared exclusive of GST, which is consistent with the method used in the Statement of Comprehensive Revenue and Expense.

Definitions of the terms used in the Statement of Cash Flows are:

"Cash" includes coins and notes, demand deposits and other highly liquid investments readily convertible into cash used by REANNZ as part of its day-to-day cash management.

"Investing activities" are those activities relating to the acquisition and disposal of long-term assets and other investments not included in cash equivalents.

"Financing activities" are those activities relating to changes in equity of REANNZ.

"Operating activities" include all transactions and other events that are not investing or financing activities.

Goods and Services Tax (GST)

These prospective financial statements have been prepared on a GST exclusive basis except for accounts receivable and accounts payable that are stated inclusive of GST.

The net GST paid to, or received from, Inland Revenue, including the GST relating to investing and financing activities, is classified as an operating cash flow in the Statement of Cash Flows.

Commitments and contingencies are disclosed exclusive of GST.

Income tax

As a public entity under section CW 38(2) of the Income Tax Act 2007, the company is exempt from income tax. Accordingly, no provision has been made for income tax.

The Statement of Significant Assumptions and Notes to the Prospective Financial Statements form part of and are to be read in conjunction with these financial statements