



Inspiring Better Buildings

ANNUAL REVIEW 2017



Inspiring the industry to provide better buildings for New Zealanders

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Our Year



We need thinkers, leaders and disruptors passionate about the building industry in New Zealand to connect, collaborate and explore diverse ways of thinking about the opportunities that face the sector.

Chelydra Percy
CHIEF EXECUTIVE OFFICER



Our Annual Review captures a selection of highlights from 2016/17. It seeks to celebrate some of our successes, acknowledge the work of our people and share less visible endeavours we undertake to realise our vision. We are proud of our achievements this year and feel privileged to play our part in inspiring the industry to provide better buildings for New Zealanders.

Context

As Greek philosopher Heraclitus said 2500 years ago, "Nothing endures but change."

Today, the building and construction sector in New Zealand is experiencing an unprecedented rate of growth. It is now at its highest level in 40 years.

In 2016/17, industry workloads continued to expand as more large infrastructure projects commenced.

Housing demand continued to outstrip supply, and building shortages impacted on too many New Zealanders.

Quality issues, damp and cold houses, escalating rental costs and housing affordability made media headlines once again. Housing has emerged as a key issue for the 2017 national election.

Natural disasters – floods, cyclones, earthquakes and fires – gripped communities and made further urgent calls on building sector resources this year.

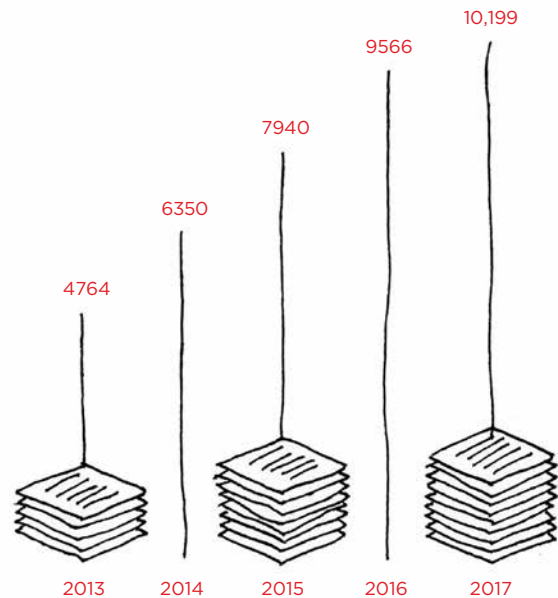
These are complex and challenging times for a sector that is itself complex and diverse.

Auckland new housing consents have grown

on average

21% pa

over the past 5 years



year end 31 March



We at BRANZ cannot solve all these issues – no single agency can – but we are determined to push ourselves beyond our comfort zone to make a real difference.

Last year, we established our new executive team, developed our Campus and Asset Management Plan, increased our investment in research and realigned our research priorities.

We made a commitment to lay the groundwork for expanding BRANZ's testing and assurance services to meet industry demand and strengthen the Government's product assurance framework.

We sharpened our knowledge transfer activities to respond swiftly to urgent information needs in the industry.

We promised more work on innovation.

And because we know that the unexpected and unknown is never far away, we issued a call for action on industry transformation across the sector.

We asked ourselves to imagine the compelling future New Zealanders want to create and how the built environment can help achieve this future.

We invite you to read on. This is the story of what we have delivered against our declared resolutions.

Listening

BRANZ works closely with the building and construction sector. We collaborate on industry-led innovation, we invest in services to support better industry performance and we undertake research to unlock new knowledge.

As an evidence-based organisation, we consult the industry on current and emerging priorities.

Every two years, in partnership with the Ministry of Business, Innovation and Employment (MBIE), we undertake the Industry Needs Survey.

The survey provides a range of industry participants with useful insights. It also tells us what the industry seeks and values from BRANZ.

This year, the survey told us that BRANZ is a highly trusted and consistent source of quality information for the sector.

It told us that the industry wants more information right now on weathertightness, housing affordability and the costs and benefits of alternative construction methods and materials.

It told us that the industry looks to BRANZ for practical solutions and innovative ideas backed by robust evidence and research.

And it told us that BRANZ is the top choice for technical and industry good-practice information.

We have listened to this advice and acted.

We heard the concerns of industry around substandard products hitting the marketplace. To support the problem in a practical way, we undertook a feasibility study to test the benefits of introducing an app-based traceability system for building products.

Indications are that such a resource will help address the problem of substandard or non-compliant products being used in the marketplace and save the industry millions of dollars in remediation costs.

The NZ building and construction industry

puts in place

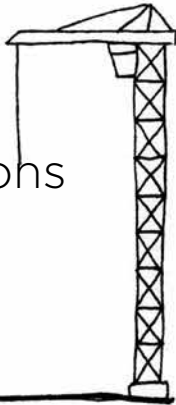
13% of NZ's
total GDP in 2016

employs

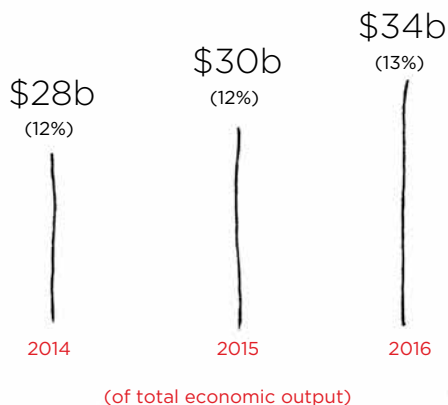
232,000 persons

which is

9.3% of all
employment



New building and construction in NZ



Non-residential and residential
building together valued at

\$474 billion

Following the Kaikoura earthquake, we marshalled our extensive suite of resources on seismic resilience to the forefront of our information channels. The hunger for trusted information was huge. Visits to our Seismic Resilience website doubled.

Following the changes for better consumer protection in the Building Act, we supported both industry and consumers with targeted information on building maintenance. We refreshed our Maintenance Schedules tool and made it freely available to the industry. We launched www.yourplace.co.nz with a digital marketing campaign so homeowners are aware that their builder is legally obliged to provide maintenance advice.

Investing wisely

Relative to the size and value of the building and construction industry in New Zealand, the income and resources of BRANZ are modest.

BRANZ income in 2016/17 totalled \$29.65 million. This comprised income from the Building Research Levy, government science funding (including \$3.20 million for National Science Challenge 11 research) and BRANZ commercial services.

Building Research Levy receipts rise and fall in concert with industry cycles. We manage these fluctuations tightly over time through our long-term Levy Utilisation policy.

For the past five years, we have steadily increased our investment in research and knowledge dissemination each year, from just over \$8.53 million in 2012/13 to \$13.73 million this year.

This translated to 225 research projects being funded including 50 external projects. The research involved collaboration with 35 research organisations (universities, Crown research institutes and private organisations).



Our Year

We targeted research initiatives of immediate relevance and value. For example, we collaborated with Panuku Development Auckland, the Property Council New Zealand and Wellington City Council to investigate the benefits of urban development authorities. The research was released in time to inform public comment on proposed legislation around urban development authorities.

More importantly, we aligned our long-term research decisions to the strategic priorities we announced last year with the launch of our four multi-year, multi-disciplinary programmes:

- › Medium-Density Housing
- › Warmer, Drier, Healthier Homes
- › Beyond the Minimum
- › Eliminating Issues of Quality.

We also continued investment in our foundational longitudinal surveys.

This year, the BRANZ 2015/16 House Condition Survey, undertaken every five years, released two seminal reports focussed on common defects, maintenance and ventilation. These reports provide challenging reading. They tell us there is much to be done to improve the performance of our residential building stock.

Conversely, the 2016 New Home Owners' Satisfaction Survey demonstrates that, even as new builds increase, the industry still manages to improve performance over owner expectations.

These surveys provide rich data sets accreted over time that are constantly mined by BRANZ researchers and BRANZ research partners.

For the past five years, we have steadily increased our investment in research and knowledge dissemination each year, from just over \$8.53 million in 2012/13 to \$13.73 million this year.

So, we have introduced an even more ambitious reporting regime this year. This new regime will deliver a state-of-the-nation review, or snapshot of New Zealand housing, every two years starting in late 2017.

We anticipate these data sets will evolve into a set of indicators that will enlighten and enliven public debate on housing and health, society, quality, markets and finances for years to come. Currently dubbed the New Zealand Housing Review, this information will be a valuable resource BRANZ can offer into the future to inform critical discussion and decision-making on housing in New Zealand.

Closer to home, we began implementation of our long-term Campus and Asset Management Plan this year with the installation of a new cone calorimeter, called an iCone.

BRANZ's fire testing engineers use the iCone tests to provide evidence for manufacturers, suppliers and installers that building materials comply with the Building Code.

The new iCone replaces an old, tired calorimeter, and its arrival means we can provide clients with greater consistency and repeatability of testing.

Informing

BRANZ maintains an unwavering commitment to unlocking our research findings. We make new knowledge accessible to industry and therefore more impactful.

We want our research to deliver tangible benefits and ripple out to be of systemic value. This has called for a significant shift in our approach to our knowledge transfer activities, which will continue over coming years.

This year, we increased access to our premier publication *Build* magazine by distributing it free of charge to all licensed building practitioners. This dramatically extended the readership and resources of *Build*. It now reaches close to 70,000 readers.

We followed suit with *Build online*, complemented by BRANZ Find, our web-based search channel designed to help busy building professionals access a wide range of detailed information.

We took our perennially popular seminar series to building industry practitioners in communities from Invercargill to the Far North.

We piloted an on-site training programme in partnership with New Zealand Certified Builders.

This programme involved a purpose-built trailer hitting 45 building sites in Waikato and Auckland with trainers demonstrating window and wall installation techniques. It proved to be an outstanding success.

Build readers survey results

After reading *Build* over the past 12 months:

- › 71% of respondents archived articles for future reference (69% in 2014).
- › 71% of respondents discussed an article with others (same in 2014).
- › 28% of respondents phoned or visited a website of an advertiser.
- › 19% of respondents purchased a product or service.
- › 18% of respondents did things differently, such as used a new product or technique.



Our Year

Leading

We have a fantastic team at BRANZ.

This year, to support our people in meeting their potential as leaders, we rolled out a leadership development programme across the organisation.

We welcomed 16 new members of staff including a cadre of social science experts. Their influence is being felt in ways refreshing to us all.

Confident about our research delivery, our knowledge sharing, our technical services and our capacity to add value, we have also addressed how BRANZ best provides leadership.

As part of this, we commissioned the study *When did disruption become a good thing?: Emerging business models in the construction industry*, by Melissa Clark-Reynolds and Dr Antony Pelosi.

Inspired by our future-focussed Behind the Seen workshops with thought leaders across the sector, the study identified new and emerging business models in the construction sector. It explored strategies to improve innovation across the industry and suggested action for industry uptake. It has been well received in many forums on industry innovation throughout New Zealand.



BRANZ has an important role as a catalyst, encouraging others in the construction sector to think differently. Innovation will come, whether or not the industry is ready for it. With strategy, research, agility, and appropriate business models, New Zealand can meet the challenges of disruptive innovation with confidence.



Melissa Clark-Reynolds and Dr Antony Pelosi,

*When did disruption become a good thing?:
Emerging business models in the
construction industry*


 Our Year

We have also progressed the development of our virtual clerk of works project,

This project is dear to our hearts because it tackles the vexing issue of quality in the build process from a system-wide perspective.

It will provide the technology to record all critical elements of a build in real time, allowing client, architect, engineer, builder, subcontractors, product suppliers and consenting officials to verify quality.

Our testing tells us it has the potential to reduce the number of on-site inspections (currently averaging 13 in Auckland) to three or fewer. It will help reduce the cost of building for all parties while simultaneously improving quality and enable early intervention, preventing problems from appearing down the track.

It will create an enduring record of build quality and, over time, should deliver an incomparable data set on build performance to inform our research.

It is an ambitious and exciting project. It is also profoundly practical. It offers a tool with the promise to transform the industry's delivery of quality and BRANZ's ability to deliver its vision: *Inspiring the industry to provide better buildings for New Zealanders.*

It is a project that illustrates that we need to push beyond what we are good at.

To inform this and to inform what BRANZ could do more of and be better at, the Board commissioned an independent stakeholder perception audit this year.

The survey participants, key stakeholders of BRANZ, told us that BRANZ plays a crucial role in helping the industry to better 'join the dots'.

They affirmed the work of BRANZ as champions of innovation. They valued BRANZ asking tough questions and pushing the boundaries of the industry mindset so that better building performance is achieved.

They challenge BRANZ to engage the industry in more long-term thinking and vision setting.

They are unanimous in calling for more explicit leadership from BRANZ.

It is a challenge we are taking on.

We said last year that leadership is not about providing all the answers. However, we agree with our stakeholders that we do have a leadership role to play in connecting the many parts and multiple strands of the industry.



The more original a discovery, the more obvious it seems afterwards.

Arthur Koestler





...for the industry to transform, it must remain open to disruption, different ideas and sometimes uncomfortable provocations.

Chelydra Percy
CHIEF EXECUTIVE OFFICER



We have continued to provide the role of 'space maker' - offering opportunities for leaders to connect across the system for future-oriented discussion, different perspectives and unexpected insights.

We have built a network of leaders in technology, urban design, demographics, social development, business and investment from around New Zealand who are passionate about the future of the sector.

We have launched a formidable piece of system-focussed work. It is the development of the New Zealand Industry Transformation Agenda, inspired by the report *Shaping the Future of Construction* released by the World Economic Forum in 2016.

The report recognises the enormous role that the building and construction industry plays in the global economy and society. It outlines performance issues faced by the industry and identifies a framework for action to produce industry transformation.

It resonates for us at BRANZ. We feel it reflects the New Zealand industry-wide situation, albeit on a different scale.

We see it having the potential to transform the industry into a cohesive, productive contributor to the economic and social wellbeing of New Zealanders.

We have shared this report and challenged the industry to think about how we can individually and collectively transform the industry here in New Zealand. The industry response has been overwhelmingly positive.

We are now progressing, with some urgency, the development of the New Zealand Industry Transformation Agenda. We will be seeking industry endorsement for its implementation later in 2017.

We feel privileged to be leading this pioneering work.

It is not without risk and calls on the courage to step much further towards the future and into the unknown.

It seems a fitting way to honour a year where so much has been achieved - by our own team here at BRANZ and by our industry and research colleagues.



Helen Anderson

Dr Helen Anderson, QSO
Chair



Chelydra Percy

Chelydra Percy
Chief Executive Officer





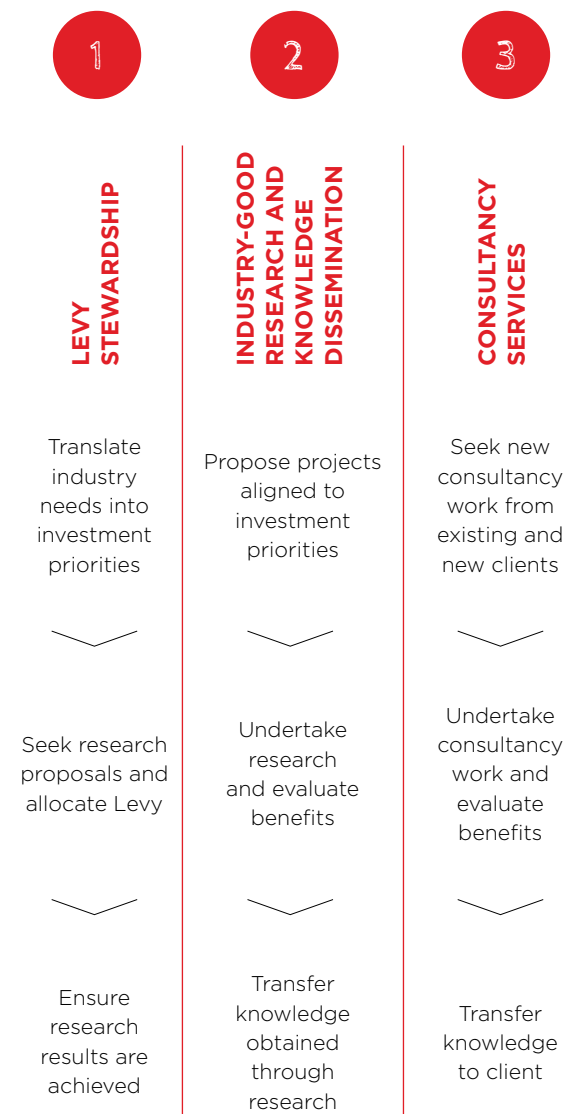
Our Work



In 2016/17,
BRANZ invested
\$13,732,441 in
research and
knowledge
dissemination
over a total of
225 projects.

Our core roles

BRANZ delivers value to the building industry in three main ways.



Levy stewardship

Wise stewardship of the Building Research Levy is a core responsibility of BRANZ.

We are committed to robust decision-making processes, transparency and disciplined management of Levy investments.

In 2016/17, BRANZ invested **\$13,732,441** in research and knowledge dissemination over a total of 225 projects. Around 70% of these are being developed by BRANZ's specialist research teams and knowledge-transfer experts. The Levy also funded 50 external projects. The research involved collaboration with more than 35 research organisations (universities, Crown research institutes and private organisations). Proposals are called for through our annual Research Prospectus and are subject to contestable funding processes.

Highlights from this year's Levy investments included:

- > four priority research programmes
- > a national Industry Needs Survey (in partnership with the Ministry of Business, Innovation and Employment)
- > research providing new insights into the private rental sector
- > Keeping Children Warm and Dry (evidence from Growing Up in New Zealand)
- > the New House Owners' Satisfaction Survey.

BRANZ also has the flexibility to respond to emerging industry issues with out-of-cycle research. Topical issues last year included urban development authorities, passive fire protection, industry changes to construction shaped by the Christchurch rebuild, and scaffolding safety.

This year, we introduced a mechanism to assess how our research improves industry practice. The first pilots look at work in fire safety, building information modelling, wet area membranes, industry productivity, subfloors and roofing systems.

Four new scholarships were funded this year to support master's and PhD students at New Zealand universities.



Our core roles

Industry-good research and knowledge dissemination

BRANZ provides independent, impartial advice based on robust science.

Our scientists and engineers undertake research to meet the demands of an evolving building industry and built-environment landscape.

This year we framed our research priorities in four interlinked programmes: preparing for **medium-density housing; exceeding the minimum** (standards); **eliminating issues of quality**; and creating **warmer, drier, healthier buildings**.

Highlights this year included:

- › assembling a body of knowledge on medium-density housing
- › revealing the condition of New Zealand's housing stock
- › exploring a range of solutions to air quality problems
- › examining how to get sustainable water use into new builds
- › testing various building claddings for weathertightness
- › reflecting major earthquakes and floods with future-proofing studies.

We maintained strong links with global research bodies and contributed to the development of New Zealand and international standards.

BRANZ is committed to turning research results into actionable and accessible knowledge.

This year we:

- › found out what excites *Build* magazine readers and provided it free to 18,000 extra licensed building practitioners, bringing the total to around 33,000 subscribers
- › enhanced our maintenance schedules with an online tool
- › released 23 e-learning modules to simplify ongoing professional development
- › took science to the industry with our popular seminar series.

Consultancy services

BRANZ Consultancy Services provides commercial testing and assessment services together with expert advice to industry clients.

This impartial and independent assessment and testing of products and technologies helps clients to demonstrate Building Code compliance.

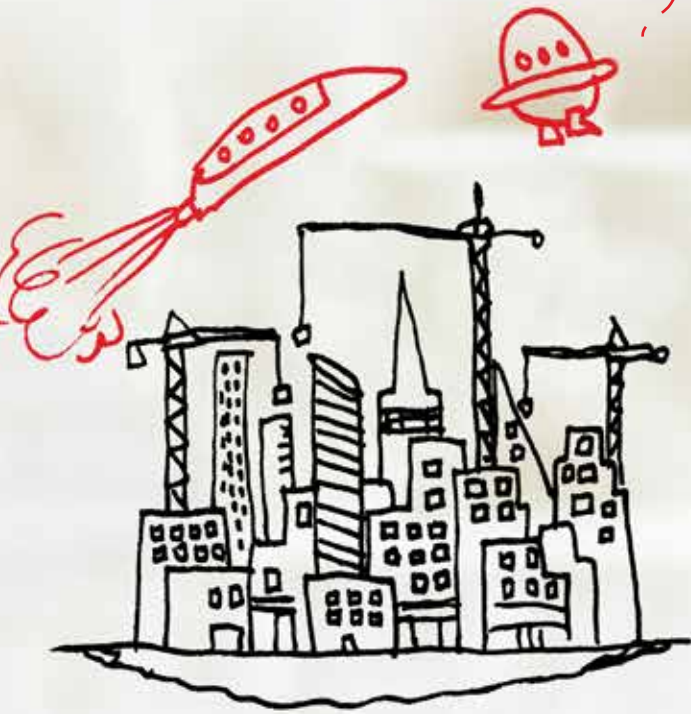
Consultancy Services is also committed to ensuring clients can successfully apply the knowledge gained from working with BRANZ to their own business.

The services we offer include:

- › fire safety assessment
- › fire testing
- › materials durability and performance
- › product and system assurance
- › structural performance
- › thermal performance
- › ventilation and energy efficiency
- › weathertightness.

Among highlights of this year, we:

- › developed weathertightness evaluation criteria for apartment block claddings
- › tested passive fire-protection features for apartments, and contributed valuable advice to BRANZ's *Guide to Passive Fire Protection in Buildings*
- › contributed to updated guidelines on engineering assessment of quake-prone structures.



Future readiness

In a rapidly changing world, the building industry must continue to address the pressing concerns of the present while envisioning our future built environment.

What will our communities look like in years to come? Where will we live, work, learn, play? What kinds of buildings will accommodate these activities? What sort of environment will industry practitioners be operating in?





Future readiness

Taking the long view

Long-range thinking is crucial to delivering “better buildings for New Zealanders”. The long view enables us to develop research that will support future housing policy and building practice.

Longitudinal surveys

In 2016/17, BRANZ progressed work on three longitudinal research projects. These provide a complete set of data that helps us understand the constantly shifting context of our research.

- › The 2015/16 House Condition Survey, jointly funded with MBIE and EECA – the initial report, released in 2016, identified a growing gap in the physical condition and maintenance level between rental and owner-occupied housing. A second report focussed on insulation, ventilation and heating – all factors in maintaining a warm, dry home. The House Condition Survey began 20 years ago and is repeated every five years.
- › The 2016 New Home Owners’ Satisfaction Survey – an annual survey BRANZ has undertaken since 2011. This survey told us that, even as new builds increase, the industry continues to improve its quality of performance against owners’ expectations. The full report is due out later in 2017.
- › The inaugural New Zealand Housing Review – an initiative that collates all existing research and insights on the sector to provide a dynamic, comprehensive picture. The initial report is due out later in 2017. The review is intended to be conducted every two years.



Longitudinal surveys provide a complete set of data that helps us understand the constantly shifting context of our research.



NZ attitudes on renting probed

We now have a better picture of New Zealanders' attitudes to renting compared with owning a home, thanks to a piece of BRANZ-funded research completed this year.

The BRANZ-commissioned Rental Housing in New Zealand was a collaboration between Massey University, the University of Otago and Auckland Council. The survey investigated the sector's diversity, demographics and experiences.

Researchers surveyed 400 landlords and 1100 tenants in Auckland, Wellington, Christchurch and Dunedin; conducted in-depth interviews; and analysed census data.

The report, which is available on the BRANZ website, provides useful insights on renting. These include:

- › 42% of New Zealanders now live in rental accommodation.
- › The dream of owning one's home is still very much alive among Kiwis.
- › Owners think of a dwelling as being an asset as much as a home.
- › Renting is viewed as a second-rate option.
- › The insecurity of renting fuels the desire to own a home.

The findings will help to provide a base for future research along with other recent BRANZ surveys into attitudes on housing. These include the 2015/16 House Condition Survey and the upcoming New Zealand Housing Review. ▶

New research framework

BRANZ refreshed its research framework and repositioned its research investment into four multi-year, multi-disciplinary programmes. Good progress has been made in 2016/17:

Medium-Density Housing has begun by defining the concept of medium-density housing, testing public attitudes and researching the supply/demand equation. In the short term, it prepares the industry for Auckland's Unitary Plan, which will stimulate housing growth in New Zealand's largest city.

Exceeding the Minimum has examined how the industry is performing under the current New Zealand Building Code and identified areas where this is not enough.

Eliminating Quality Issues gathered detailed evidence on recurring problem areas for building. It did feasibility studies on instituting systems for building pathology, life-cycle design and electronic traceability of New Zealand construction products.

Warmer, Drier and Healthier Buildings has progressed a suite of projects aimed at supporting the industry so it can improve air quality in indoor environments for all New Zealanders. ▶

✦ [Medium-density housing](#) see p23

✦ [State of nation's housing](#) see p28

✦ [Understanding quality](#) see p35

✦ [State of nation's housing](#) see p28



Preparing for medium-density housing

In 2016, BRANZ launched a new research programme focussed on compiling better information about medium-density housing in New Zealand's future urban landscape.

The social context for BRANZ's medium-density housing research programme is population growth, housing shortages, housing affordability issues and the imminent approval of Auckland's Unitary Plan.

To date the programme has conducted three key pieces of baseline research. One set out to define and describe medium-density housing, one examined public perceptions and the third analysed the supply and demand equation. Together these strands enrich current knowledge about medium-density housing and are helping set the scene for future research priorities.

BRANZ's definition of medium-density housing is multi-unit dwellings (up to six storeys). This can include mid-rise apartment blocks of four to six storeys or attached housing of more than four units. It does not include stand-alone houses.

The demand-side analysis suggests medium-density housing will grow steadily (6% a year) over the next 10 years to meet future housing pressures. By then, it

will represent a much bigger share of the housing market than it does today. The supply-side analysis affirms that medium-density housing offers big opportunities to the building industry. To make that transition from traditional housing types, the industry will need to evolve its thinking and skills.

A key message from Understanding the Drivers of Medium-Density Housing, a nationwide survey, is that New Zealanders still have a way to go in accepting the inevitable growth of medium-density housing. Many people surveyed considered this type of housing a visually unattractive option and had concerns about building quality. The industry will help to change these perceptions by showing they can maintain standards of quality, the report concluded.

Current research being undertaken by BRANZ is focussing on aspects of liveability and maintenance. Further research will look at the industry's capacity and interest in medium-density housing as well as technical construction issues. ▶



A useful mechanism on urban development structures

A BRANZ study completed this year has helped shed light on the future use of urban development authorities (UDAs) in New Zealand.


The Case for Urban Development Authorities in New Zealand set out to analyse whether UDA structures could be useful for planning of urban regeneration projects. The overall conclusion was that they are, but only when set up effectively and underpinned by clearly defined objectives and roles.

Key findings were:

- › International experience shows that UDAs struggle to be profitable, but they do create economic value once wider benefits are factored in.
- › Wider benefits include increased values in properties surrounding the regeneration area.
- › Such improved values reflect improved amenities, services and social outcomes such as community health.

The Levy-funded research was undertaken by Ian Mitchell of Livingston & Associates and jointly funded with Panuku Development Auckland, the Property Council and Wellington City Council. It responds to a Productivity Commission report in 2015 about the structure and powers UDAs would need for urban redevelopment.

The BRANZ-funded research focusses on the profitability and economic sustainability of UDAs, especially in Auckland. It draws on experiences from both New Zealand and overseas. It also examines other benefits of UDA-led property development, such as increasing the supply of social and affordable housing within a specific community or urban area.

The report was released early in 2017 as the government called for public consultation on planned UDA legislation. It is published on the BRANZ website. 



Getting to know how we use water at home


BRANZ has been working to plug a gap in knowledge on New Zealand's domestic water usage.

The Residential Water Use Study examines the ways we use water at home and probes just how water-conscious New Zealanders are.

The three-year project is now half-way through. In the first stage, BRANZ teamed up with Water New Zealand and DataCol to survey 3000 households nationwide. The aim was to understand social demographics, household behaviour and consumer awareness.

This year, a daily-use meter was installed in 300 homes. The readings will help add an understanding of external influences such as time of day and seasonal weather patterns. Scientists have also been installing a more high-resolution water meter in a further 300 homes to analyse exactly how, when and where domestic water is used.

The first set of awareness analysis findings is expected once all water meters are in place late in 2017. The project will set a platform for future research into how the industry can incorporate better water-conservation features in residential buildings. The findings will also support the water industry in forecasting demand, scoping future infrastructure needs and educating domestic users.

The study builds on previous BRANZ water-use projects run in Auckland (commissioned by Auckland Council-owned utility Watercare) and on the Kapiti Coast. 

Future readiness



‘The people’s challenge’ unleashed

BRANZ hosts National Science Challenge 11: Building Better Homes, Towns and Cities. More than 200 researchers from 25 science organisations will be involved in the initial stage of the Challenge over the next five years.

The Challenge got off to a high-profile start on 5 May 2016 at the Ngāti Whātua Ōrakei Kāinga Tuatahi in Auckland. It was launched by then Minister of Science and Innovation Steven Joyce, who dubbed it “the people’s challenge”. In attendance were many researchers from universities, Crown research institutes, local government, the building industry and private research organisations.

The National Science Challenge will bring together researchers to identify and prepare for future ways of living that reflect New Zealand/Aotearoa’s identity. This vision is set within the context of increasing multiculturalism, dynamic population shifts and accelerating climate change.

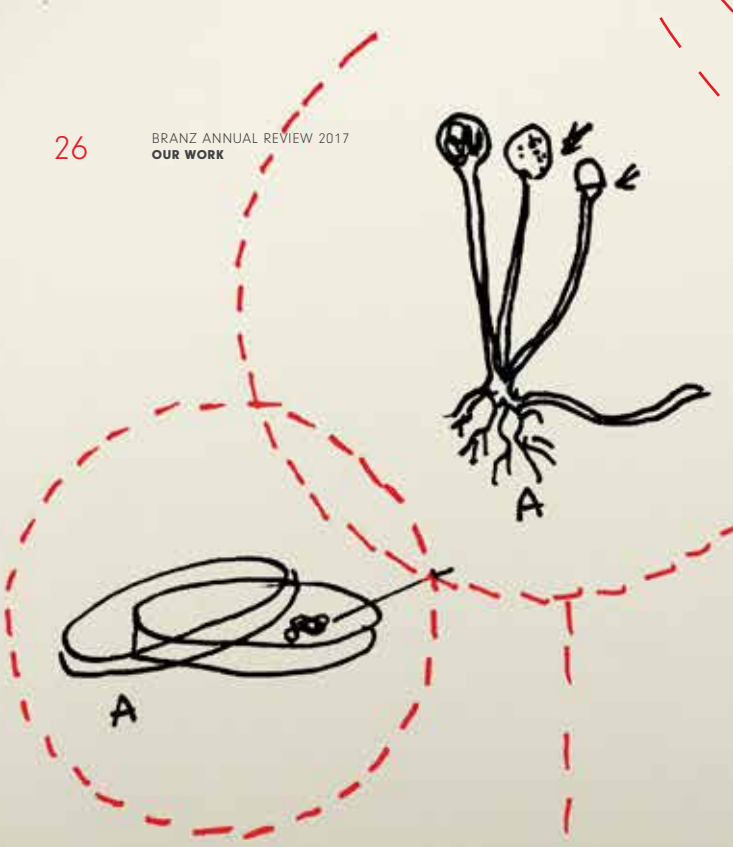
The launch location was chosen as an exemplar of these objectives. The Kāinga Tuatahi social housing project provides high-quality yet affordable homes to support intergenerational living for the Ōrakei community. The dwellings boast several innovative sustainability features.

The Challenge has six strategic research areas:

1. Architecture and logic of decision-making
2. Supporting success in regional settlements
3. Shaping place: future neighbourhoods
4. Next-generation information
5. Transforming the building industry
6. Kāinga Tahi Kāinga Rua.

The six inter-related research programmes aim to achieve a number of forward-looking outcomes. These include user-friendly urban environments, quality houses that are both cost-effective and affordable, good decisions on sustainable land use and innovation for the building industry. 





Healthy buildings

The spaces we inhabit can be harmful to health. Among many hidden culprits are dampness, dust and pollutants. Buildings themselves also face health risks, whether from leaking facades or potential fire spread. BRANZ's work keeps the building structures and end users firmly in focus.





Occupant behaviour supports effective ventilation

Well-designed ventilation is an important component of today's homes for keeping indoor environments warm, dry and healthy. Now a BRANZ research project has investigated how much of a role occupants' behaviour plays in effective air quality control.


The Occupant Ventilation Behaviour study was begun in early 2016. Researchers set up more than 800 sensors in 100 or so occupied residential buildings around New Zealand. For six months spanning the winter period, these sensors measured humidity and temperature in various rooms, especially bedrooms and bathrooms. They also measured how much doors and windows were left open and for how long. More than 12 million data records were collected.

Initial findings suggest rooms in homes around New Zealand are far too cold for much of the time. Occupants tend to heat their homes only in the morning and evening when they are at home. Occupants are also not opening the windows enough, particularly in modern draught-free, airtight homes. That in turn traps more moisture indoors. When internal doors are left open, the moisture is then carried through the house.

Once the sensors were recalled, survey participants were questioned about their ventilation habits; problems they had experienced with damp and mould at home; and how these problems affected their living comfort.

The responses indicated that New Zealanders generally observe good ventilation practice when at home. For example, three-quarters of respondents ventilate their bathroom – either through opening windows or using an extractor fan – while showering and bathing.

All but five of the participating households were also part of the BRANZ 2015 House Condition Survey. The latest version of this five-yearly nationwide survey included a focus on dampness and mould problems in New Zealand homes, especially rental ones.

Combining data from the House Condition Survey and the Occupant Ventilation Behaviour study will provide new insights into how householders ventilate their homes. It will also bring a better understanding of how occupants' behaviour impacts on their indoor environment. 





Indoor air quality review


Throughout 2016 BRANZ did a comprehensive stocktake of all existing information on indoor air quality to inform future industry practice.

The researchers reviewed all literature about indoor air quality in or relevant to the New Zealand built environment. Some 350 publications were cited.

Since the review's release in January 2017, several international research organisations have asked to link to it or add it to their publication database on indoor air quality research.

The project also included information-gathering participation at international events. The researchers attended indoor air quality and ventilation-focussed conferences in Washington DC, USA, in September 2016, and Seoul, Korea, in October.

A crucial part of the project was a workshop held at Massey University in early 2017. BRANZ launched and presented the review to stakeholders from the building industry, the government, the private sector and research organisations. They then discussed what New Zealand needed to do to make progress on indoor air quality.

The indoor air quality review is published on the BRANZ website. 

 [Innovative technology](#) see p33

Healthy buildings



Physical state of nation's housing examined

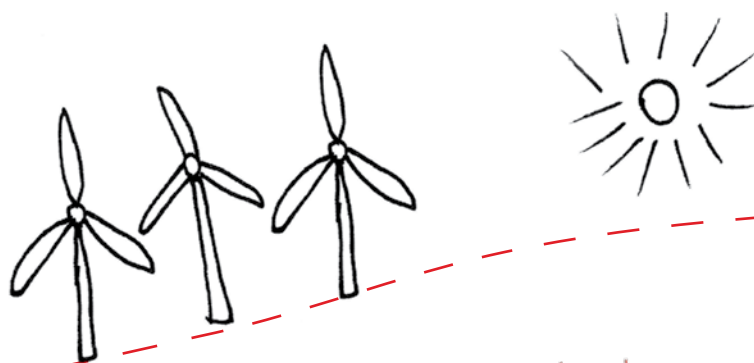
The first stage of the nationwide BRANZ 2015/16 House Condition Survey, which included an in-depth look at rental stock, came to fruition in 2016.

This is the latest five-year segment of a 20-year longitudinal project looking at the physical state of New Zealand's housing. It is jointly funded with the Ministry of Business, Innovation and Employment (MBIE).

The latest survey assessed up to 49 features of a house, from the foundation and subfloor to the roof and decks. Also included were some external features, such as paths and sleepouts. The assessment applied a scale from serious (harmful to health, needs immediate attention) to excellent.

Early in 2017, an initial report was released. The report rates the condition of property components and materials and highlights common defects. It also compares how owner-occupiers and tenants maintain their homes.

A key finding was that rental dwellings are typically in a much poorer condition, both inside and out, than owner-occupied ones. Rentals particularly showed this difference in relation to interior linings and fittings, exterior doors and windows. Mould was visible in about half of all houses surveyed and more so in rental properties. Tenanted properties are twice as likely to be poorly maintained (the lowest of three ratings) as owner-occupied ones.



However, the overall number of poorly maintained homes had dropped off since the previous survey. This figure was down from 25% to 14% for owner-occupied homes and from 44% to 32% for rental properties. BRANZ believes government initiatives such as Warm Up New Zealand, which subsidises insulation installation, may have been a factor.

A follow-up survey aimed to gain insights in how householders ventilate their homes and how that affects the indoor environment. The researchers surveyed 64 households over the winter months.

The report from the secondary study will be released later in 2017. It will focus on issues of insulation, ventilation and heating – all important factors in maintaining a warm, dry, healthy home.

Early versions of the House Condition Survey were confined to metropolitan centres. The 2010 version added rental properties in the mix for the first time. The 2016 study expanded the scope further to include housing in provincial centres and rural areas. It also broke out the ventilation segment as a separate survey for the first time. 

2015/16 results:

5% of households (surveyed) did not usually heat living areas in winter

Tenants used **unflued gas heaters** in winter in 17% of living areas and 6% of bedrooms

Though nearly all bathrooms had an openable window, **only 49% had an extractor fan** venting to outside

48% of owner-occupied houses were **well maintained**, compared with 24% of rental ones

14% of owner-occupied houses were **poorly maintained**, compared with 32% of rentals



Healthy buildings



Learnings from social housing renovation

The Kotuku Apartments project, in which BRANZ undertook research during a rebuilding project, yielded valuable information on tenants' energy usage in 2016/17.

BRANZ scientists monitored various performance aspects of the building, including:

- › indoor temperature and humidity
- › energy use (for lighting, heating and water heating)
- › heat transfer between the interior and exterior.


The research arose after BRANZ recognised a gap in guidance for social housing landlords on how to protect their investment thermally. The researchers hunted around for a live, real-time building project that would present a suitable model.

Wellington City Council's multimillion-dollar upgrade of the Kotuku Apartments, home to some 108 tenants, was chosen as highly suitable. The upgrade included adding insulation and mechanical ventilation, work that interested BRANZ.

Both before and after the renovation, BRANZ scientists used thermal modelling and thermal imaging to compare space-heating energy use and expected thermal performance.

As part of the project, BRANZ commissioned the Centre for Research Evaluation and Social Assessment (CRESA) to undertake a social survey in 2016. The aim was to understand tenants' energy-use behaviour and experiences with the upgrades.

A key finding from the thermal modelling was that few tenants heated their space regularly. The social survey confirmed that many tenants were unaware of the pros and cons of heating their apartments.

The upgraded complex was opened in March 2017. BRANZ will be sharing its findings with providers of low- and medium-income housing through two fact sheets. It has also run two seminars for designers, architects, specifiers and council staff. Three study reports from the research are to be published on the BRANZ website. 



Fit for children

BRANZ-funded research this year considered the future health of our children when exploring different aspects of air quality.

Three Levy-funded studies gathered valued insights for informing ventilation improvements in future building design.


Researchers from the University of Otago, Massey University and GNS Science measured indoor and outdoor pollution at a Wellington primary school over a six-week period. The school operates out of prefabricated buildings that are poorly insulated and ventilated. It is also located at a busy intersection with high pollution levels from traffic fumes.

Results supported the case for an air quality system at schools such as this to ensure the health of students and staff. The researchers say the study addresses knowledge gaps about how outdoor air pollution interacts with the indoor environment in buildings near busy roads. Further exploration will be needed on how to prevent outdoor pollutants from infiltrating classrooms.

Another BRANZ-based study investigated how roof design can be refined to avoid moisture-related problems in the roof cavities of classrooms.

BRANZ researchers monitored moisture and temperature levels in a single primary school over both winter and summer months. The research aimed to determine how much moisture students add to classrooms. The study focussed on modern, open-plan learning environments.

A pilot for the Leading Light cohort of the longitudinal study Growing Up in New Zealand measured indoor air quality in classrooms and homes of 150 eight-year-olds. The data was collected in 2016 by a team from the University of Auckland.

In 2017, the information from the Leading Light pilot will be analysed to draw conclusions about how the health of buildings affects children's health and education. 

 [Indoor air quality](#) see p28



Helping councils assess fire risks


This year, BRANZ completed a research project into passive fire protection that will lead to much-needed support for building inspectors.

Passive fire protection components are often hidden inside building elements, and problems are not apparent during ordinary building work. In recent years, as several large leaky-home complexes in Auckland were pulled apart for repair, widespread instances of non-compliant passive fire protection assemblies were exposed.

The project required BRANZ researchers to spend time with a council to understand the scope of non-compliant construction. In the fire laboratory at BRANZ's Judgeford premises, the researchers tested several representative non-compliant passive fire assemblies. Their aim was to provide information that would help the industry make good decisions on passive fire protection in existing buildings.

With leaky homes, bringing passive fire protection to full compliance not only complicates or delays the repair but it can add costs, the researchers say. In some cases, the costs can equal those for the original weathertightness repair. In other cases, no repair option may be available to provide full compliance.

The research was the first stage in a project to develop a passive fire risk-assessment model or tool for building inspectors. The tool will help them assess the risks of passive fire against the cost of repair and whether it is practicable or reasonable to bring a building to full compliance.

This year, alongside the research, BRANZ developed a guide and ran a series of workshops on passive fire protection. These were aimed at designers of new buildings as well as inspectors. 

 [Upgraded fire cone](#) see p37



A simulated flood of valuable data

BRANZ's three-year Flood it! project was set up to examine all the ways water damage affects building materials. In the second year, the focus turned to the effects of microbial growth in walls.

Early in the project, our materials scientists and engineers had erected at BRANZ's Judgeford campus four small, Code-compliant houses in various common New Zealand styles. These houses have been repeatedly flooded.

This year, wall cavities were immersed in contaminated water. For microbiology testing, BRANZ collaborated with ESR. Over the year ahead, the team will be trying to force-grow mould in a wider range of materials.

The aim of the project is to improve our understanding of how materials behave when they get wet.

This will ultimately help designers make the best choices for improving resilience in homes. Such knowledge will become increasingly valuable as the housing shortage forces more new building in flood-prone areas, such as Auckland's reclaimed land.

There are still further flood effects to be studied. For example, the severe flooding in Bay of Plenty in early 2017 further highlighted problems with silt, which sets like concrete when it dries. ▶

Healthy buildings

Innovative technology could tackle mould in New Zealand homes

A pilot study by BRANZ researchers explored whether an emerging technology could kill off mould spores and air contaminants in indoor living spaces.

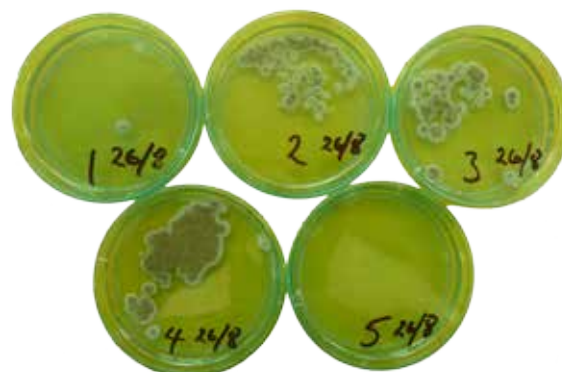
The existence of airborne contaminants in living spaces has implications for the health of building occupants. In New Zealand, we traditionally use ventilation to remove such contaminants from indoor air.

The BRANZ study, begun in late 2016, suggests another approach could be effective, especially where ventilation is poor.

The technology produces highly active radicals that interact with and neutralise airborne contaminants. It is based on a process known as photocatalytic oxidation (PCO). PCO technology can clean indoor air by using ultraviolet light from the sun.

The research showed strong potential for PCO as a solution to mould in indoor living spaces. Further work is needed on practical applications in a New Zealand context. The researchers believe the technology could be incorporated into a wide range of building components, such as paint, concrete, timber and glass.

The extent of mould in New Zealand homes, especially rental homes, was highlighted in the 2016 BRANZ House Condition Survey. The survey report suggests a range of ways, besides ventilation, that house designers can help to keep mould at bay. These include the positioning of living spaces relative to the sun, insulation, window frames and double glazing. ▶





Driving quality

Quality is integral to all building activity and BRANZ's work in service of the building industry. One of BRANZ's four priority research programmes launched this year focusses on eliminating quality issues. Another aims to create an environment in which the industry routinely performs above the minimum regulatory standard.



Understanding quality, analysing defects

Two studies BRANZ completed in 2016/17 explore the issue of quality and will provide a foundation for future BRANZ research on the subject.

What is Quality in Buildings? sought to define what is a defect and what is acceptable quality in various building types, including residential, social housing and commercial.

This research has defined three levels of building performance quality as:


- › basic - as per the New Zealand Building Code
- › enhanced - blending aesthetic with functional considerations for fit-for-purpose buildings
- › high - exceeding minimum standards.

Basic quality buildings meet minimum standards designed to safeguard building users from injury or illness, loss of crucial amenities and fire risks, the study finds. Enhanced quality addresses how a building will cater for a range of users over time. It may also place more emphasis on sustainability features. High quality reflects better workmanship based on higher skills and longer experience, better products/materials and client-focussed processes.

The study report notes that ample tools and resources are available to help new-build clients decide what level of quality to aim for. The report is available on the BRANZ website.

A complementary piece of work was A Building Pathology System in New Zealand - What is Possible. A pathology system for residential buildings is a way of identifying existing and emerging trends in defects. It would collate all information, from a range of building practitioners, about the causes and symptoms of known defects. This information could then be analysed to develop best-practice solutions and prevent future problems. It could also provide early-warning signs for problem materials, such as a new style of cladding.

The study concludes that a building pathology approach would work in New Zealand if it had support from everyone involved in the design, building and monitoring of houses. It would need to be based on a comprehensive overview of defects in the housing sector, such as the BRANZ House Condition Survey.

Further BRANZ research into quality is planned for 2017. This will isolate which defects or combination of defects could be most damaging to New Zealanders' health and wellbeing, the national economy or the industry's reputation. 





BRANZ expertise feeds into national seismic resource

BRANZ contributed expertise this year to updated Ministry of Building, Innovation and Employment (MBIE) guidelines designed to bring more consistency in seismic assessment.

The Building (Earthquake-prone Buildings) Amendment Act 2016, which is expected to take effect on 1 July 2017, sets up a national policy framework for assessing existing buildings. This aims to provide more information for building owners and to strike a balance between:

- › protecting people from harm in an earthquake
- › the costs of strengthening or removing buildings
- › the impact on our built heritage.


The framework will also provide more information for building users, such as a publicly accessible register of buildings determined to be earthquake-prone and their quake ratings.

Among changes to the Building Act, the crucial resource *Assessment and Improvement of the Structural Performance of Buildings in Earthquakes* has been revised. It has been renamed *Seismic Assessment of Existing Buildings: Technical Guidelines for Engineering Assessments*. The resource, designed for structural engineers, now reflects lessons from the

Christchurch earthquakes. It also incorporates new knowledge and research in engineering assessment methods for quakes.

BRANZ Principal Structural Engineer Graeme Beattie has co-written two sections of the revised edition. These cover timber buildings and secondary and non-structural elements.

One of these sections also includes findings from three BRANZ research projects conducted over the past three years. These cover:

- › the seismic performance of full-scale timber-framed buildings – for the Ministry of Education (MoE) and Housing New Zealand
- › large open buildings such as gymnasiums and halls, with mixed timber/steel bracing systems – for MoE and MBIE
- › bracing provided by generic bracing elements – building research Levy-funded. 



Driving quality



Upgraded cone enhances fire testing


BRANZ received a boost to its future-proofing capability with a replacement cone calorimeter for the fire testing team.

The equipment, called an iCone, is used to burn homogeneous (non-melting) solid materials such as treated timber, plastic and wall linings at very high temperatures. The iCone measures how much oxygen is consumed by the burning material and then calculates the rate of heat release.

The iCone, which replaces a cone calorimeter installed in 1995, features improved automation for ease of use and sophisticated up-to-date software.

BRANZ fire testing engineers use the iCone tests to provide evidence for manufacturers, suppliers and installers that building materials comply with the Building Code.

The equipment can also be used in BRANZ research, such as for understanding the characteristics of certain materials.

The cone replacement, along with a new fan and crane for the fire lab, forms the first stage of work under BRANZ's long-term Campus and Asset Management Plan. This stage involves replacing or refurbishing ageing property, plant and equipment over the next five to eight years. 



E-traceability system could save millions


An app-based traceability system could help consumers make better choices when buying building products.

It could also save the industry the millions of dollars needed to fix problems caused by the sale and use of substandard, non-compliant products. These were conclusions of a feasibility study completed this year by BRANZ.

The study considered the benefits of introducing an app-based traceability system to support greater vigilance and transparency.

The app would allow a prospective buyer to cross-match a product with nationally held data. This would reveal details such as the product's country of origin, who made it and what testing and assessment had been done to show Building Code compliance. It would also show any environmental concerns over the product's constituents.

The research estimated that fixing of non-conforming products costs New Zealand at least \$95 million a year. To implement and run an app-based traceability system would cost about \$6 million. Removing just 30% of non-compliant products from the shelves would bring a saving of around \$30 million a year.

BRANZ is considering further investment to develop the system and app. 



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To implement and run an app-based traceability system would cost about **\$6 million**.

Even if just **30%** of non-compliant products were removed from the shelves, that would save around **\$30 million** a year.

Cladding appraisals product fills gap

BRANZ's newly developed set of appraisal criteria for wall cladding is an example of spotting a market gap and finding a solution.

The criteria stem from a BRANZ research project, completed this year, on testing claddings for performance in medium-rise residential buildings (apartment blocks). The researchers recognised that these types of buildings fell through the compliance cracks.

Medium-rise buildings use residential-style claddings, light timber or steel framing and the same technology as for low-rise housing. Yet traditionally, medium-rise buildings have been assessed for weathertightness compliance based on criteria for high-rise commercial buildings.

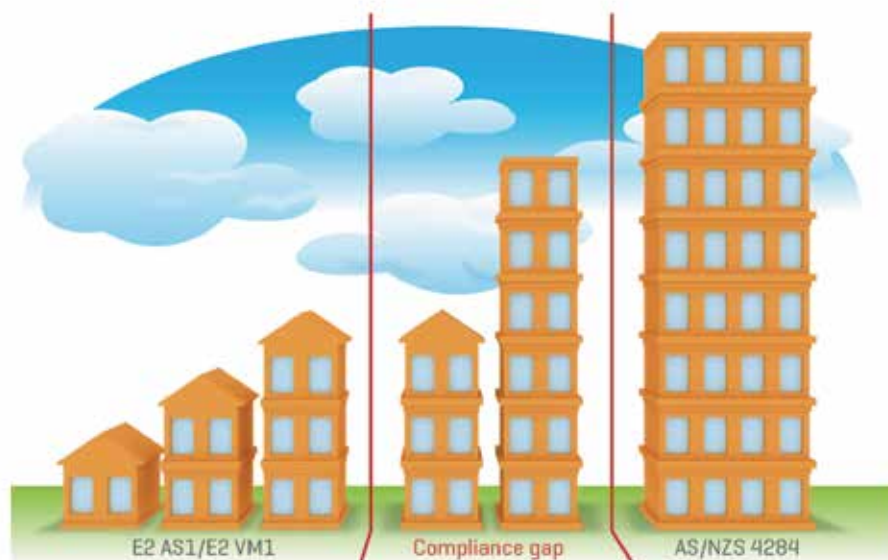
We are now seeing a strong demand for mid-rise residential buildings (three to six storeys) in New Zealand cities. This style of building is being encouraged by Auckland's Unitary Plan and plays an important part in Christchurch's post-quake rebuilding.

BRANZ experts have developed a system, called WeatherPlus, to help companies through the consenting process. WeatherPlus will introduce more appropriate testing and assessment for mid-rise buildings and provide a faster, more robust compliance pathway.

Not only can this system speed up the consenting process, it will also assist façade consultants with verification of their design. In turn, this will provide savings for both cladding supplier and client.

The system is also relevant to recladding requirements for the remediation of leaky buildings.

The BRANZ Assurances Services team has been testing WeatherPlus with clients. 





Engaging with industry

Connecting and engaging with the industry is an essential element of BRANZ's operation. We do this on many fronts. We listen to members to find out what information they need. We pass on the knowledge gained from Levy-funded research through a range of tools and channels. We take our knowledge to the world and bring industry members into our world.






Engaging with industry



Industry tells us what information they need

For the past 20 years, BRANZ has undertaken an Industry Needs Survey to find out what information industry members most want and need.

The latest survey, undertaken in partnership with MBIE, was completed in October 2016. It collected 1127 responses divided across six industry areas: builders/contractors; officials; designers; architects; engineers/consultants; and others.

BRANZ uses the survey findings to inform its process of Levy investment in research and identify gaps in research. The findings are now available on the BRANZ website. 



Key findings:

- › Satisfaction with knowledge dissemination has improved since the 2014 survey.
- › Builders and designers are the most positive and architects the least positive about the quality of knowledge available.
- › The biggest recognised knowledge gaps are in meeting housing needs and building better cities/communities.
- › The most important topics where people need up-to-date information are weathertightness, housing affordability and costs-benefits of alternative construction methods and materials.
- › Product specification websites are a key source of information, and BRANZ channels are the top choice for technical/good-practice information.



Engaging with industry

Ventilation experts hit the road

Four BRANZ ventilation experts took to the road this year to explain their work to the industry in a series of eight seminars.

Showing the faces behind the research were Senior Physicists Manfred Plagmann, Stephen McNeil and Stephan Rupp, together with Structural Engineer Greg Overton.

The *Ventilation* seminar series was held in main centres from Auckland to Dunedin over two weeks in February/March 2017. The target audience was architects, engineers, designers, builders and property managers – anyone with an interest in the science of buildings.

The four presenters spoke about moisture issues caused by inadequate ventilation and science-based solutions to the problem. Topics were divided into living space (such as how to dry out damp houses, effective duct and fan selection) and roof space (such as when is ventilation needed and factors leading to condensation). ▶



Quake resources go off the scale

BRANZ's ability to be agile and respond to unexpected one-off events came to the fore after the 7.8 magnitude Kaikoura earthquake on 14 November 2016.

In the edition of *Build* magazine's monthly newsletter that immediately followed, BRANZ actively promoted all *Build* articles and BRANZ online information on quake-resilient design, performance and repair. The response was immediate.

Visits to the BRANZ Seismic Resilience website, set up in 2015 to build on learnings from the Canterbury earthquakes, dramatically spiked. The dedicated site provides a wealth of technical information on how to incorporate quake-proofing features into buildings.

November 2016 figures for page views almost doubled from October. The most popular topics searched in November included earthquake risk zones, faults in New Zealand and foundations in residential buildings.

For BRANZ, the key learning is that people (homeowners, builders and tradespeople) faced with devastating events threatening their homes and built environment immediately reach out for trusted advice and information.

BRANZ is currently working on a more comprehensive compendium of resources on resilience and recovery from extreme weather events and earthquakes. ▶



Build hits the mark

To keep the contents of the *Build* suite of publications fresh and relevant, BRANZ listens carefully to the industry.

BRANZ needs to know where its efforts are hitting the mark or could be improved. This year, 600 readers from across the building and construction industry shared their views in a biennial survey.

What we learned from the 2016 *Build* Readers' Survey:

- › Each copy of *Build* is used by 2.11 readers on average – that's nearly 70,000 people in total
- › The content is well read – 95% of respondents read at least half of each issue
- › 83% found it very useful or essential – significantly, of the 45% of respondents who identified as licensed building practitioners (LBPs), 100% of them found *Build* useful
- › Between 93% and 96% rated *Build* highly for interesting and useful content, visual appeal and ease of reading.

Build has been published as a monthly printed magazine since 1990 and has been available online since 2014. It has built a loyal and growing readership.

From June 2016, *Build* was made available free to all LBPs, and a new section on LBP knowledge was added. This brought in another potential 18,400 readers, bringing the current audited circulation to 32,388 copies. *Build* also goes out to building and construction (BCITO) apprentices twice a year. ■

Examples of building tasks that people did differently after reading *Build*:

- › used gable junction detail, roof junction detail and ridge flashing design
- › changed detailing of cladding junctions
- › direct-fixed cladding to window installation
- › improved flashing practice
- › retrofitted wall insulation
- › updated contract agreements
- › advised clients on fire alarms
- › used *Build* articles in staff meetings to teach apprentices new ways




Opening a window on on-site learning

A BRANZ-sponsored pilot exercise this year tested how builders respond to on-site teaching.

In early 2017, trainers from New Zealand Certified Builders (NZCB) took a window and wall framing, positioned on a purpose-made trailer, to 45 buildings sites in Waikato and Auckland. In a brief 30-minute session, the trainers – practising builders themselves – demonstrated and explained installation solutions.

The topic was one of several suggested by building consent authorities as a common reason for failed building inspections.


The sessions were open to all builders, apprentices and tradespeople. BRANZ supported this project to help expand its audience reach beyond those who regularly attend seminars and read publications. Results showed that participants found this informal, hands-on approach to training highly effective. 

Learning links with licensed building practitioners

BRANZ and licensed building practitioners (LBPs) have enjoyed a fruitful partnership in the online learning space this year.

In 2016, BRANZ developed 16 e-learning modules on a variety of building-related subjects. These included bracing for earthquakes and wind, the physics of moisture and energy efficiency.

Seven new modules were developed in early 2017. Four were on aspects of framing and three were on building consent, aimed specifically at LBPs.

The modules are short, practical and easy to access. They follow a scenario and have a quiz at the end. Learners can go back as often as they like and retake the quiz. When they get it 100% correct, they are sent an email attesting to their evidence of learning. This is especially valuable to LBPs for building up their continuing professional development record. 



Co-producing material with the team at BRANZ has proven to be an enormous value-add for both MBIE and our population of licensed building practitioners. BRANZ's innovative publications, training services, research and testing all provide a strong platform to enhance practitioner knowledge and lift building quality.

Paul Hobbs

REGISTRAR OF LICENSED BUILDING PRACTITIONERS





Visiting days at Judgeford

During the year, BRANZ's Judgeford campus outside Wellington buzzed with visitors keen to see industry-based research in action.

Large groups of students in many building-related disciplines enjoyed on-site tours. They came from institutions such as Bay of Plenty (BOP) Polytechnic, Wellington Institute of Technology (WelTec), Victoria University of Wellington and Universal College of Learning (UCOL).

Plumbing, gasfitting and drainlaying students from WelTec were taken through BRANZ's Assurance Services process. In the structures lab, students were shown how plumbing fixtures fitted incorrectly could weaken the structural integrity of a building.

BOP Polytechnic second-year architecture students visited BRANZ's structures, insulation and fire labs. They were also interested to understand how BRANZ's Assurance Services worked.

The Registered Master Builders Association sent along 40 apprentices for their annual trades training day, and 40 attendees at the Master Joiners annual conference in Wellington took time out for a tour.

Some industry groups were keen to add to their expertise in specific areas. Naylor Love Construction sent 20 project managers to find out more about building envelopes and Assurance Services. Forty visiting members of New Zealand Certified Builders were also interested in building envelopes. ▶

Schedules made more interactive

BRANZ Maintenance Schedules were made free to the industry in May 2016 and later enhanced.

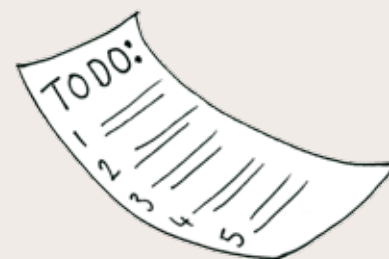
The tool includes a dedicated microsite (www.yourplace.co.nz) for consumers, where they can learn about the use and value of maintenance schedules before discussing this with their architect or builder.

In March 2017, the tool was upgraded and extra functionality was added. Users can now:

- > make copies of saved schedules to use as templates, which overcomes the problem of having to create each new schedule from scratch
- > manage and store saved schedules and favourites
- > share completed schedules, via email, between users of the tool.

As part of the upgrade, the site also gained a fresh, modern look, and the navigation was made more user-friendly.

The enhanced tool will specially benefit larger firms that build multiple homes to the same specifications. ▶






Collaboration a winning formula

Teamwork across the disciplines of architecture, engineering and construction management is increasingly a key to producing better buildings. This was demonstrated in the ArchEngBuild 2016 design challenge.

The intensive three-day event, managed and hosted by BRANZ, was held in Auckland in July 2016. It involved nearly 30 of New Zealand's top final-year students in architecture, engineering and construction management from nine academic institutions. Their mission was to design a liveable environment while demonstrating the importance of effective interdisciplinary collaboration.

The top prize went to Amber Haddock (construction manager), Emily Pearce (architecture) and Kha Pham Nguyen (engineer). Their concept, titled Sunset Boulevard, was inspired by a shared passion for 1950s cinema.


This event, now in its fifth year, was originally conceived by the Cement and Concrete Association (CCANZ). This year, it included construction management students for the first time, as reflected in the name change from ArchEng.

ArchEngBuild 2016 was funded by BRANZ and supported by the New Zealand Institute of Architects (NZIA), the Institution of Professional Engineers (IPENZ) and the New Zealand Institute of Building (NZIOB). 

Programme stands the test of time

BRANZ's long-standing commercial relationship with Ravensdown fertiliser works in Christchurch has been proving the value of BRANZ's independence and impartiality this year.

BRANZ has been working with the giant fertiliser producer for 15 years, monitoring the impact of their manufacturing emissions on building materials in the surrounding environment. The BRANZ testing provides evidence that Ravensdown needs for complying with a condition of its resource consent.

This year, BRANZ collected and analysed nearly 900 samples. We also evaluated test materials exposed in other industrial zones to act as control sites. The results showed consistently low rates of material degradation – well within the accepted range for areas influenced by industrial activity. 



BRANZ has provided their expertise by defining a practical method and a robust annual technical assessment. Their independence and expertise provide assurance in the site's operations.



Peter Hay
RAVENSDOWN WORKS MANAGER

Spreading the word of BRANZ

BRANZ scientists and commercial teams travelled in New Zealand and abroad through the year to showcase their work and maintain links with the industry.


Structural Engineers David Carradine and Roger Shelton attended the 14th World Conference on Timber Engineering (WCTE) in Vienna in September 2016. David presented a research paper on 'Full-scale building and wall testing to evaluate lateral load performance of existing timber-framed school buildings in New Zealand'.

In February 2017, Senior Social Scientist Casimir MacGregor presented a paper on 'Consumer perspectives on building beyond code in New Zealand' at the Australasian Housing Researchers Conference in Melbourne.

In November 2016, Better Building Research Team Leader Patricia Shaw delivered the keynote address, Corrosion of Polymeric Materials, to the Australasian Corrosion Association (ACA) conference in Auckland. She was the first woman to ever do so. She received the AC Kennett Award, for the best paper presented under the ACA auspices dealing with non-metallic corrosion.

BRANZ Assurance Services gave a workshop at the three-day BuildNZ conference/expo in Christchurch in August 2016. We demonstrated how we set benchmarks for technical excellence in product and system evaluation. The workshop drew interest from potential clients for BRANZ's commercial testing services.

In November 2016, members of the BRANZ Fire Testing team attended the Fire Protection Association of New Zealand conference in Auckland. Senior Fire Testing Engineer Peter Whiting presented a paper on the importance of passive fire protection and promoted BRANZ's upcoming *Passive Fire Guide*.

BRANZ Senior Physicists Manfred Plagmann and Stephen McNeil shared their findings from BRANZ's former Weathertightness, Air Quality and Ventilation Engineering (WAVE) research programme. 



Levy investments 2016/17

New Building Research Levy investment decisions made in 2016/17.

The total budget allocation is given. Note that these amounts are subject to change. For a full list of Levy-funded projects this year, refer to *Levy in Action 2016/17*.

* Shaded content denotes projects led by external partners

| Project | Total budget |
|---|--------------|
| Automation, Industrialisation and New Technologies | |
| Haddock: scholarship | \$20,000 |
| Building information modelling (BIM) initiative | \$250,000 |
| Better Buildings | |
| Application of chaos theory to seismic engineering | \$90,000 |
| Court-Patience: scholarship | \$20,000 |
| Design of hybrid timber structures for multi-storey and medium-density housing applications | \$300,000 |
| Design, installation and seismic restraint of interior partitions and walls | \$92,000 |
| Fire-safe use of timber construction | \$837,000 |
| Good Practice Guide <i>Internal Linings</i> (2nd edition) | \$20,000 |
| Good Practice Guide <i>Texture-coated Claddings</i> (2nd edition) | \$20,000 |
| Level Sustainable Building Series <i>Electrical Design</i> (2nd edition) | \$20,000 |
| Level Sustainable Building Series <i>Heating, Cooling and Ventilation</i> (2nd edition) | \$20,000 |
| Level Sustainable Building Series <i>Plumbing</i> (2nd edition) | \$20,000 |
| Meth houses: building material interactions and resilience – a scoping study | \$90,000 |
| Pallet racking | \$20,000 |
| Noble: scholarship | \$20,000 |
| Passive fire protection quality | \$399,000 |
| Preparing the foundation for risk-informed fire safety design | \$270,000 |
| Quality – preliminary investigation report | \$100,000 |
| Reducing earthquake damage to irregular light timber-framed (LTF) buildings | \$385,000 |
| Towards durable timber structures | \$440,000 |
| Using COMSOL software for building physics | \$145,000 |
| Warmer, drier, healthier buildings – knowledge transfer | \$73,000 |
| Maintaining and Improving the Performance of Existing Buildings | |
| Askew: scholarship | \$20,000 |
| Bridging the (fire safety) gap | \$11,000 |


 Levy decisions

| Project | Total budget |
|--|--------------|
| Materials Performance | |
| A durability evaluation framework for innovative materials | \$625,000 |
| Corrosion in the Bay of Plenty environment | \$236,000 |
| Ensuring affordable concrete supply after 2020 | \$110,000 |
| Operating Environment | |
| 2016 Industry Needs Survey | \$37,000 |
| Air quality in New Zealand homes: a scoping study | \$25,000 |
| New Zealand housing review | \$459,000 |
| Redevelopment of BRANZ Maintenance Schedules | \$80,000 |
| Valuing the role of construction in the New Zealand economy, 2016 | \$50,000 |
| Virtual clerk of works - phase 2 | \$1,440,000 |
| Virtual clerk of works - transformation management and hosting | \$300,000 |
| Productivity | |
| ArchEngBuild 2017 | \$95,000 |
| Leadership through future thinking | \$250,000 |
| Monitoring industry performance | \$180,000 |
| New House Owners' Satisfaction Survey | \$250,000 |
| People's movements across firms and contribution to firms' productivity in the construction sector | \$113,000 |
| Sustainability | |
| New Zealand best-practice energy/thermal simulation | \$140,000 |
| Residential water use | \$290,000 |
| Southworth: Scholarship | \$20,000 |
| Ade: Scholarship | \$75,000 |
| Medium-density Housing (MDH) programme | |
| Acoustical design of MDH | \$116,000 |
| Defining MDH for New Zealand | \$180,000 |
| Developing tools to measure and improve quality and liveability of MDH developments | \$98,000 |
| Fire spread from lower roofs: building an evidence base outlining barriers and constraints | \$428,000 |

| Project | Total budget |
|---|--------------|
| Medium-Density Housing (MDH) programme, continued | |
| Getting MDH through the (resource consenting) hoops: barriers and constraints | \$85,000 |
| Market research for MDH projects | \$60,000 |
| MDH construction quality survey | \$200,000 |
| Medium-Density Housing programme leadership | \$56,000 |
| MDH fact sheets | \$120,000 |
| MDH information resource | \$160,000 |
| Testing claddings for performance in medium-rise buildings, especially multi-unit residential apartments | \$360,000 |
| The new MDH market: demand-side analysis | \$140,000 |
| The new MDH market: supply-side analysis | \$150,000 |
| Understanding MDH | \$85,000 |
| Understanding owners' and residents' gaps in knowledge on maintenance | \$89,000 |
| Exceeding the Minimum programme | |
| Building to rent | \$180,000 |
| Design decisions | \$105,000 |
| Doing better: assessment of New Zealand research for currency and impact | \$94,000 |
| Exceeding the Minimum programme leadership | \$53,000 |
| LCAQuick Residential: adapting a new tool for residential building design | \$178,000 |
| Quantifiable evidence of building beyond the Code | \$150,000 |
| The choice to exceed: understanding consumer-focussed messages and tools; audit of current advice for consumers | \$145,000 |
| Understanding life-cycle design: disseminating the benefits of a new technique for evaluating the impacts | \$176,000 |
| Which standards can be exceeded to provide benefits? | \$150,000 |
| Who benefits from exceeding the minimum? | \$93,000 |
| Eliminating Quality Issues programme | |
| Adopting new ways | \$80,000 |
| Eliminating Quality Issues programme leadership | \$53,000 |
| Evidencing quality issues: what industry data can tell us | \$54,000 |
| Literature review: work completed to try to solve common quality issues | \$15,000 |
| Literature review: examples of successful solutions to quality issues | \$15,000 |
| Prioritising quality | \$150,000 |
| A building pathology approach: understanding and addressing common quality issues | \$60,000 |
| What is quality in buildings? | \$140,000 |

| Project | Total budget |
|--|--------------|
| Warmer, Drier and Healthier Buildings programme | |
| Airtightness of apartments | \$720,000 |
| Airtightness trends, impacts and energy-saving opportunities | \$420,000 |
| Basis for an internal moisture verification method | \$90,000 |
| Exploring indoor environment in schools and homes – school MonitoBox | \$100,000 |
| Exploring indoor environment in schools and homes – nature of indoor air pollution in New Zealand homes and garages | \$100,000 |
| Exploring indoor environment in schools and homes – exposure to indoor air pollution at school | \$100,000 |
| Getting homes dry | \$75,000 |
| Identifying sources and characteristics of particulates and volatile organic compounds (VOCs) in New Zealand residential dwellings | 100,000 |
| Indoor environmental and fungal exposure in residential homes | \$143,000 |
| Keeping our children warm and dry: evidence from Growing Up in New Zealand | \$100,000 |
| Monitoring conditions and airflows in roofs | \$73,000 |
| New Zealand's experimental buildings | \$525,000 |
| Potential impact of energy-saving building design on occupants' health | \$94,000 |
| Retrofitting wall insulation – a risk assessment | \$260,000 |
| Ridge and fascia vent design and performance | \$187,000 |
| Roof design | \$165,000 |
| Roof design pathways | \$210,000 |
| Ventilation performance in large-span roofs | \$360,000 |
| Warmer, Drier and Healthier Buildings programme leadership | \$68,000 |

BRANZ places a strong emphasis on accessible actionable knowledge that can enhance industry practice. To achieve this, it invests in knowledge transfer, such as delivering *Build* magazine free to all licensed building practitioners and running nationwide seminar programmes. In 2016/17, this investment was \$2,856,000.



Levy decisions

Investing in young researchers

Each year, \$250,000 is made available for outstanding postgraduate scholars in New Zealand tertiary institutions.

The aims of the scholarship programme are to add diversity to BRANZ's portfolio of investments, support future research and strengthen BRANZ's relationship with tertiary education. The scholars' research must align with the priority themes as outlined in Building a Better New Zealand, the cross-industry research strategy, or with other identified industry needs.

Young scholars with outstanding academic credentials and early-stage researchers pursuing innovative projects can apply for scholarships of up to \$25,000 a year for three years. Typically, master's students gain one-year scholarships and PhD students three-year terms.

This year, BRANZ supported a cohort of 20 postgraduate scholarships, including four that began in 2016:

Mike Bedford
University of Otago,
Wellington, PhD

Mike's research aims to find whether there is an increased risk of infectious disease (particularly enteric and respiratory disease) associated with environmental conditions in New Zealand full-day childcare centres. The research looks at heating, ventilation and design and links to Otago University's Housing and Health programme.


Zubin Karami
University of
Auckland, PhD

Zubin's research examines the durability performance of polyurethane adhesive interface for laminated timber products produced in New Zealand. Despite interest in the New Zealand timber industry to move to formaldehyde-free adhesives, there are questions about the durability performance of such adhesives. The research aims to address the New Zealand concerns and generate base knowledge for input into the New Zealand Building Code.

Peter Marriott
University of
Canterbury,
Master's

Peter is investigating the applicability limits of commonly used fire models in fire safety design. The research aims to develop design guidelines for fire models of large rooms with relatively small fire growth. The guidelines will combine with the existing design guidelines to create robust and reliable modelling of fire in buildings in New Zealand. This will help fire engineers undertake more efficient design, which will lead to improved public safety.

Penny McGowan
Massey University,
Master's

Penny's research looks at the performance of solar collectors as a low-cost, easily retrofitted solution to improving air quality and reducing heating costs in New Zealand schools. To be accepted commercially, this technology needs to predict the performance of the unit in different climates and demonstrate how much ventilation it is producing. The project is part of a wider research study focussed on improving the classroom environment in New Zealand. 



Scholarship has a flow-on effect

What Amber Garnett found most rewarding about being a BRANZ scholar was the relationships she built with esteemed scientists in her specialist area.

Another plus was that the mentoring she received helped keep her research grounded in industry practice.

Amber is one of 20 young researchers who were supported by the BRANZ postgraduate scholarship programme this year.

For her master's with Massey University, Amber evaluated water footprinting methodologies and their applicability to New Zealand. Of growing concern in this country is the increasing demand for freshwater, coupled with the environmental impacts of its allocation and degradation.

Amber's research calculated the water footprints of concrete manufacturing plants around New Zealand.




BRANZ's environment is great for productivity.

Amber Garnett
BRANZ SCHOLAR



It also aimed to determine the associated impact of water consumption by calculating water-scarcity factors at New Zealand catchment level. The research contributes to the New Zealand whole-building whole-of-life framework.

Amber's BRANZ scholarship began in November 2014 and continued through to May 2017. Initially, she would check in once a week with her supervisor David Dowdell, BRANZ Principal Sustainability Scientist. Simultaneously with completing her master's topic, Amber worked part-time at BRANZ from August 2016 on another water-related project.

Amber has loved working in BRANZ's premises at Judgeford with its striking modern architecture and functional, colleague-accessible layout. She has also enjoyed the sheep-dotted open space, away from city distractions. "BRANZ's environment is great for productivity," she says. 



Our Governance



...we are responding with courage, care and the determination to make a positive difference for the industry and New Zealanders.



Dr Helen Anderson, QSO
CHAIR



BRANZ directors

BRANZ Incorporated and BRANZ Limited are governed by directors with extensive building and construction, science, business and senior public-sector expertise.

Five directors of both BRANZ Incorporated and BRANZ Limited are elected by the Building Research Advisory Council (BRAC). In turn, the elected Board can appoint up to three independent directors.

At 31 March 2017, the BRANZ Board has seven directors and one associate director.



Dr Helen Anderson, QSO

Dr Helen Anderson (Chair) is an independent director of several organisations and former Chief Executive of the Ministry of Research, Science and Technology. She is a Chartered Fellow of the Institute of Directors in New Zealand. She joined BRANZ in 2011.



Kevin Stanley

Kevin Stanley (Deputy Chair) has more than 25 years' experience in the construction industry and is currently Managing Director of the Stanley Group. He is a Chartered Member of the Institute of Directors in New Zealand and joined BRANZ in 2012.



Our regular meetings and interactions with industry leaders almost always end with a call for BRANZ to take a more confident leadership role in the construction sector. Where this seems both strategic and wise, we are responding with courage, care and the determination to make a positive difference for the industry and New Zealanders.

Dr Helen Anderson, QSO
CHAIR



Alan Bickers, MNZM, JP

Alan Bickers has had a lengthy career in civil engineering, management, consulting and governance. He is experienced with regulatory functions, including building consents and compliance. He is a Chartered Fellow of the Institute of Directors in New Zealand and a Past President and Distinguished Fellow of the Institution of Professional Engineers NZ (IPENZ). As inaugural chairman of the Building Practitioners Board for eight years, he was responsible for developing and implementing the Licensed Building Practitioners Scheme. He joined BRANZ in 2015.



Richard Carver

Richard Carver has a background in business leadership, management and governance. Richard is a co-owner of Jennian Homes, Milestone Homes and Construction Marketing Services Limited. He is also a Chartered Member of the Institute of Directors in New Zealand. He joined BRANZ in 2013.





Lesley Haines

Lesley Haines has an extensive public sector and client-focussed background. She currently heads the Overseas Investment Office at Land Information New Zealand (LINZ) and is a board member of Motu Economic and Public Policy Research. Lesley joined BRANZ in 2014.



Stephen Titter

Stephen Titter combines many years of practical financial and investment experience. Formerly a senior partner and board member for Ernst & Young (EY), he is now a director on several boards, including the Real Estate Institute of New Zealand and the Selwyn Foundation. He joined BRANZ in 2014.



Richard Merrifield

Richard Merrifield is a former Chair of both the New Zealand Certified Builders Association and BRAC. He is Deputy Chair of the Building Practitioners Board. He joined BRANZ in 2011.



We must strive for a resilient built environment that can help challenge its stakeholders to be world-leading and innovative, and provide safe, effective and economical structures for New Zealanders.



Kevin Stanley
DEPUTY CHAIR

Relishing a taste of the building industry

Supporting the changes needed in the building industry with such diversity of players, views and motivations is no easy task.

This is what Sunil Surujpal found after spending a year behind the scenes with the BRANZ Board.

Sunil was appointed an associate director for 2016/17 as part of BRANZ's leadership commitment to demonstrating good governance practices to the industry. The associate director role was developed by the Institute of Directors in New Zealand as a way of mentoring emerging directors. As associate, Sunil attended all Board meetings and was involved in discussions without formal voting powers.

Coming into the role, Sunil had no knowledge of the building industry beyond being a homeowner – a “normal consumer”, he says. Most of what he knew about the issues he had gleaned from the media, like everyone else.

During his stint with BRANZ, he came to understand the industry's complexity – the “staggering number of players from the one-man band to the big development firms and local authorities”.

Also eye-opening was the “sheer range of materials involved and how they all combine to create a finished product”. The big challenge, he now sees, is how to get all industry players “lined up on thinking”.

He enjoyed observing a well functioning Board of disparate views and seeing how they could reach a single unified position after rigorous discussion. He also valued learning about the nuances of interacting with management.

Sunil felt encouraged to contribute, especially on forward-looking initiatives being explored by BRANZ such as the virtual clerk of works project. This aligned with his own professional work in new technology as a senior manager with Accenture.

He feels the associate director concept provides an excellent taster for directorship. “It has been a very fulfilling experience,” he says. “I'm sad to see the end of it.”



Sunil Surujpal

Sunil Surujpal is a senior manager in Accenture and Chair of the Junior Rugby Board for the Wellington Rugby Football Union. Sunil was the recipient of the Institute of Directors in New Zealand Emerging Director award in November 2015. His appointment as associate director on the BRANZ Board was a governance development opportunity for the 12 months to 31 March 2017.



It has been a very fulfilling experience... I'm sad to see the end of it.



Sunil Surujpal
ASSOCIATE DIRECTOR



Executive team

Chelydra Percy

Chief Executive

Chelydra joined BRANZ in 2013. Prior to starting with BRANZ, Chelydra held a range of leadership roles with science and innovation organisations such as Callaghan Innovation, KiwiStar Optics and Scion. Chelydra has also worked in the electricity supply and telecommunications industries. She is a graduate of Victoria University of Wellington and a Companion of the Institution of Professional Engineers New Zealand.

| Name | Position |
|---------------------------|---------------------------------------|
| Laurel Lee Berkett | PA to CEO/Company Secretary |
| Richard Capie | General Manager, Research Investment |
| Janet Geritzlehner | Human Resources Manager |
| David Johnson | General Manager, Consultancy Services |
| Chris Litten | General Manager, Industry Research |
| Kaetrin Stephenson | General Manager, Corporate Services |

Board remuneration

Directors' fees for the BRANZ Group are reviewed annually. The Board seeks independent advice to help with this process. The Board confirmed at the July 2016 annual meeting that fees would not change. The honorarium for BRAC also remained unchanged.

BRANZ directors' fees

| Board roles | Annual fees |
|----------------------------------|-------------|
| Chair | \$52,000 |
| Deputy Chair | \$32,240 |
| Director | \$26,000 |
| Subcommittee chair | \$6,000 |
| Representative on external board | \$6,000 |

| BRAC honoraria | Annual fees |
|----------------|-----------------------|
| Chair | \$2,800 (per meeting) |
| Members | \$1,150 (per meeting) |

Building Research Advisory Council

The Building Research Advisory Council (BRAC) plays a vital role in ensuring BRANZ's accountability and responsiveness to the New Zealand building and construction industry.

The Council meets twice a year to elect the BRANZ Board and advise on industry issues for BRANZ's consideration.

BRAC has 14 members representing 12 nominating bodies from the industry and trades, the business sector, consumers and the government.

In 2016/17, BRAC welcomed three new members:

- > Anna Butler, representing the Ministry of Business, Innovation and Employment (MBIE)
- > Jacqui Bensemman, representing the New Zealand Specialist Trades Contractors Federation (NZSCTF)
- > Alistair Miles, for Business New Zealand.

The latter two were appointed in February 2017.

| Name | Nominee of |
|-------------------------------------|--|
| John Melhuish, Chair | New Zealand Institute of Architects |
| John Macdonald, Deputy Chair | Registered Master Builders Association |
| Simon Barber | Registered Master Builders Association |
| David Brown | New Zealand Certified Builders Association |
| John Coop | Property Council of New Zealand |
| Michael Davis | New Zealand Institute of Architects |
| Renelle Gronert | Housing New Zealand Corporation |
| Marshall Hudson | Business New Zealand |
| Ian McCormick | Local Government New Zealand |
| Grant Price | New Zealand Specialist Trades Contractors Federation |
| Richard Sharpe | Institution of Professional Engineers New Zealand |
| Stephen Walker | Building Industry Federation |
| Bill Whitley | Consumer New Zealand |
| Anna Butler | Ministry of Business, Innovation and Employment |
| Jacqui Bensemman | New Zealand Specialist Trades Contractors Federation |
| Alistair Miles | Business New Zealand |

BRANZ directors – register of interests

As at 31 March 2017

| Name | Directorships with | * Shareholdings in | Other relevant interests |
|--------------------|---|---|---|
| Helen Anderson | <ul style="list-style-type: none"> » Dairy NZ Ltd » Dexcel Holdings Ltd » Dairy NZ Inc » Anderson Associates NZ Ltd » NIWA » Massey University Council » Antarctica NZ » Chair, Wellington Branch of Institute of Directors » Member, National Council of Institute of Directors » Wellington Regional Economic Development Agency (WREDA) » Lincoln Hub Ltd | | <ul style="list-style-type: none"> » Chair, Department of Internal Affairs External Advisory Committee » NZ Police Assurance and Risk Committee » Helen Anderson Family Trust » Clearpoint Ltd, Advisory Board » Chair Inquiry into Statistics House Performance |
| Alan Bickers | <ul style="list-style-type: none"> » Jayal Enterprises Ltd » Trustpower Ltd » Trustpower Insurance Ltd | <ul style="list-style-type: none"> » Cavotec SA (Sweden) » Infracore Ltd (including various subsidiaries) » Jayal Enterprises Ltd » Metlifecare Ltd » SmartFONZ (portfolio investment) » Trustpower Ltd (including 16 subsidiaries in New Zealand and Australia) » WW Health GBP PLC (UK) » Tilt Renewables Ltd | <ul style="list-style-type: none"> » Trustee, Jayal Trust |
| Richard Carver | <ul style="list-style-type: none"> » Construction Marketing Services Ltd » Jennian Holdings Ltd and other associated Jennian companies » Milestone Holdings Ltd and other associated Milestone companies » Productspec Ltd » Renovation Masters Ltd | <ul style="list-style-type: none"> » Construction Marketing Services Ltd via a trust » Jennian Holdings Ltd via a trust » Milestone Holdings Ltd via a trust » Construction Marketing Services Ltd has a 100% shareholding in Productspec Ltd » 50% shareholding in Renovation Masters with Kevin Stanley | <ul style="list-style-type: none"> » Master Builders Residential Working Group |
| Lesley Haines | <ul style="list-style-type: none"> » Motu Economic and Public Policy Research (from August 2016) | | <ul style="list-style-type: none"> » Acting Deputy CE, LINZ |
| Richard Merrifield | <ul style="list-style-type: none"> » Plumbers, Gasfitters and Drainlayers Board » Building Practitioners Board (Deputy Chair) » Standards Approval Board | <ul style="list-style-type: none"> » R.J. Merrifield Ltd » Double M Holdings Ltd | <ul style="list-style-type: none"> » Construction Strategy Group » Contractor to RMBA |
| Kevin Stanley | <ul style="list-style-type: none"> » Stanley Group Ltd and subsidiary companies » Renovation Masters Ltd | <ul style="list-style-type: none"> » Nivek Holdings Ltd » Renovation Masters Ltd | <ul style="list-style-type: none"> » Matamata Futures Inc » MD of Stanley Group of companies » Matamata Ski Club |
| Stephen Titter | <ul style="list-style-type: none"> » American Chamber of Commerce in NZ, Inc » Guilford Investments Ltd » Hahei Consulting Ltd » Real Estate Institute of NZ Inc » Realestate.co.nz Ltd » REINZ Member Services Ltd » Selwyn Foundation | <ul style="list-style-type: none"> » Hahei Consulting Ltd | <ul style="list-style-type: none"> » The Woolstore Group: Business Mentor » Great Grandkids Trust: trustee » Jennian Group – business strategy advisor » Hahei Beach Trust: trustee |
| Sunil Surujpal | <ul style="list-style-type: none"> » Wellington Rugby Football Union | | <ul style="list-style-type: none"> » Accenture New Zealand |

Standard disclosure statement to be affirmed at the beginning of every Board meeting:

It is recognised that some members of the BRANZ Board represent companies or organisations or interests that are, or may be, in competition with those of other Board members. Meetings of the BRANZ Board and communications between members of the Board will not be used as a forum for unlawful collusion or anti-competitive conduct.

* Disclosure of significant shareholdings only, e.g. not shares held by family trusts.



TODO:
1 _____
2 _____
3 _____
4 _____
5 _____



The BRANZ Group derives its total income from a combination of the Building Research Levy, government science funding and commercial services.



Our Financial Performance





Financials

BRANZ total income for 2016/17 was \$29.65 million.

This consisted of:

- › \$18.44 million from the Building Research Levy to fund industry research and knowledge transfer
- › \$7.20 million from commercial services
- › \$3.20 million to fund NSC 11 research
- › \$0.81 million of other income.

This compares with \$25.06 million for the previous year.

Expenses were directly managed, which resulted in spending of \$26.32 million for the 2016/17 financial year. This was used to operate the business, directly deliver research outcomes, deliver the research under NSC 11, inform the industry and invest with other research providers. Expenditure in the previous year amounted to \$21.37 million.

During the year, BRANZ was appointed as the host to implement the 11th National Science Challenge (NSC 11): Building Better Homes, Towns and Cities.

A breakdown of the BRANZ Group financial results can be viewed on subsequent pages.

Long-term Levy utilisation policy

BRANZ gets its research income from Building Research Levy receipts, which are directly linked to the levels and values of building consents. This means Levy income is subject to the same boom-bust cycles as the industry.

BRANZ has a long-term Levy utilisation policy in place that helps manage these ups and downs in Levy income. It uses a 10-year model to create a stable, sustainable platform for BRANZ to invest the Building Research Levy effectively. In practice, this means that, when Levy income increases, BRANZ is prudent around expanding its investment. Then when Levy income decreases, BRANZ doesn't have to make unnecessary or drastic cuts.

The policy sets out how BRANZ will effectively manage the Levy by:

- › determining a Baseline Levy Investment Sum using the 10-year model. This is incorporated into the annual BRANZ Group budget for investment in Levy-funded activities
- › investing the Baseline Levy Investment Sum in internal and external research and knowledge dissemination
- › investing the Levy in an open, transparent and contestable way
- › ensuring that any investment in core internal capability is linked to BRANZ's long-term strategic priorities
- › investing to avoid unnecessary duplication of capability and facilities across New Zealand
- › ensuring availability of funding for maintenance and investment in property, plant and equipment
- › maintaining appropriate cash reserves.

The long-term Levy utilisation policy is reviewed annually.

Cash reserves

The BRANZ Group has cash reserves of \$29.39 million as at 31 March 2017. This balance includes \$4.03 million of NSC 11 funding, which is yet to be spent. All funds and the level of cash reserves are held in accordance with the BRANZ Group investment and reserves policy.

Funding for investment in property, plant and equipment

BRANZ funds the maintenance and development of facilities at Judgeford and elsewhere in New Zealand. A Campus and Asset Management Plan has been adopted by the Board to ensure that our facilities meet the industry research and testing needs for the future. The plan has identified over 20 projects that are required to retire, replace and refurbish ageing property, plant and equipment over the next five to eight years.

In the next three to five years, around \$25 million to \$30 million of investment in this plan will be required. A detailed investment case will be developed for each project. The projected level of cash reserves ensures that this work can be undertaken without seeking additional funding from industry or the government.

Critical and industry issues

BRANZ also needs to be able to respond to critical issues affecting the industry. Provision of \$1 million is made in the cash reserves for this. For example, in the aftermath of the Canterbury earthquakes, BRANZ was able to draw on its reserves for critical issue funding even while the Group was running a deficit.

Emergency operating costs

BRANZ also ensures that it holds enough cash in reserve to be able to have access to a minimum of three months of operating costs for an emergency. This provision is currently \$5.5 million. Should the need arise, the cash reserves would help to cover these funding requirements.

Cash float to fund day-to-day operations

BRANZ has cash float reserves in keeping with normal business practices. This currently stands at \$2.5 million. These funds are used to cover day-to-day activities.

Independent review

An independent review of our approach to reserves was commissioned in 2014 to ensure that the levels held are appropriate. The review noted that our approach is consistent and in line with other organisations similar to BRANZ.



Building Research Association of New Zealand Inc.

Summary statement of comprehensive income

For the year ended 31 March 2017

| | Group | | Parent | |
|--|-------------------|-------------------|-------------------|-------------------|
| | 2017 \$ | 2016 \$ | 2017 \$ | 2016 \$ |
| Operating income | | | | |
| Building Research Levy Act levies | 18,436,802 | 16,985,547 | 18,436,802 | 16,985,547 |
| Commercial work fees | 7,204,726 | 6,776,767 | 0 | 0 |
| National Science Challenge 11 (NSC 11) funding | 3,199,897 | 368,579 | 0 | 0 |
| Other Government research grants | 0 | 177,771 | 0 | 0 |
| Charges to BRANZ Limited | 0 | 0 | 1,605,538 | 1,758,050 |
| | 28,841,425 | 24,308,664 | 20,042,340 | 18,743,597 |
| Other income | | | | |
| Interest received | 809,995 | 743,607 | 645,852 | 672,247 |
| Other income | 2,101 | 8,365 | 2,101 | 8,365 |
| | 812,096 | 751,972 | 647,953 | 680,612 |
| Total income | 29,653,521 | 25,060,636 | 20,690,293 | 19,424,209 |
| Expenditure | | | | |
| Personnel costs | 11,164,096 | 9,923,936 | 1,293,515 | 1,217,121 |
| Contracts - BRANZ Limited | 0 | 0 | 11,532,788 | 9,745,284 |
| Other operating costs | 15,157,724 | 11,449,724 | 5,803,779 | 5,435,422 |
| Total expenditure | 26,321,820 | 21,373,660 | 18,630,082 | 16,397,827 |
| Surplus before income tax | 3,331,701 | 3,686,976 | 2,060,211 | 3,026,382 |
| Income tax (expense)/benefit | (197,324) | 195,007 | 0 | 0 |
| Surplus for the year | 3,134,377 | 3,881,983 | 2,060,211 | 3,026,382 |
| Total comprehensive income for the year | 3,134,377 | 3,881,983 | 2,060,211 | 3,026,382 |

Building Research Association of New Zealand Inc.

Summary statement of changes in equity

For the year ended 31 March 2017

| | Group | | | Parent | |
|--------------------------|---|----------------------------|-----------------------|----------------------------|-----------------------|
| | Foreign Currency Translation Reserve \$ | Retained Earnings \$ | Total Equity \$ | Retained Earnings \$ | Total Equity \$ |
| Balance at 1 April 2015 | 22,131 | 30,846,574 | 30,868,705 | 29,374,540 | 29,374,540 |
| Movement for year | 9,430 | 3,881,983 | 3,891,413 | 3,026,382 | 3,026,382 |
| Balance at 31 March 2016 | 31,561 | 34,728,557 | 34,760,118 | 32,400,922 | 32,400,922 |
| Balance at 1 April 2016 | 31,561 | 34,728,557 | 34,760,118 | 32,400,922 | 32,400,922 |
| Movement for year | (1,641) | 3,134,377 | 3,132,736 | 2,060,211 | 2,060,211 |
| Balance at 31 March 2017 | 29,920 | 37,862,934 | 37,892,854 | 34,461,133 | 34,461,133 |


 Financials

Building Research Association of New Zealand Inc.

Summary statement of financial position

As at 31 March 2017

| | Group | | Parent | |
|--------------------------------------|-------------------|-------------------|-------------------|-------------------|
| | 2017 \$ | 2016 \$ | 2017 \$ | 2016 \$ |
| Assets | | | | |
| Current assets | | | | |
| Term deposits | 25,980,000 | 16,000,000 | 18,800,000 | 15,000,000 |
| Other current assets | 6,999,697 | 9,115,922 | 3,268,953 | 4,781,374 |
| Total current assets | 32,979,697 | 25,115,922 | 22,068,953 | 19,781,374 |
| Non-current assets | | | | |
| Property, plant & equipment | 11,978,366 | 12,226,505 | 11,978,366 | 12,226,505 |
| Investment in subsidiaries | 0 | 0 | 1,000,000 | 1,000,000 |
| Deferred tax asset | 0 | 195,007 | 0 | 0 |
| Other non-current assets | 111,568 | 85,910 | 111,568 | 85,910 |
| Total non-current assets | 12,089,934 | 12,507,422 | 13,089,934 | 13,312,415 |
| Total assets | 45,069,631 | 37,623,344 | 35,158,887 | 33,093,789 |
| Liabilities | | | | |
| Current liabilities | | | | |
| Trade and other payables | 1,888,931 | 1,622,737 | 622,275 | 638,422 |
| Other current liabilities | 5,157,714 | 1,144,362 | 68,574 | 51,860 |
| Total current liabilities | 7,046,645 | 2,767,099 | 690,849 | 690,282 |
| Non-current liabilities | | | | |
| Deferred tax liability | 2,317 | 0 | 0 | 0 |
| Other non-current liabilities | 127,815 | 96,127 | 6,905 | 2,585 |
| Total non-current liabilities | 130,132 | 96,127 | 6,905 | 2,585 |
| Total liabilities | 7,176,777 | 2,863,226 | 697,754 | 692,867 |
| Equity | | | | |
| Retained earnings | 37,892,854 | 34,760,118 | 34,461,133 | 32,400,922 |
| Total equity | 37,892,854 | 34,760,118 | 34,461,133 | 32,400,922 |
| Total equity and liabilities | 45,069,631 | 37,623,344 | 35,158,887 | 33,093,789 |

Building Research Association of New Zealand Inc.

Summary statement of cash flows

For the year ended 31 March 2017

| | Group | | Parent | |
|--|--------------|-------------|-------------|-------------|
| | 2017 \$ | 2016 \$ | 2017 \$ | 2016 \$ |
| Net cash from/(used in) operating activities | 7,444,495 | 3,931,564 | 2,238,357 | 3,297,772 |
| Net cash from/(used in) investing activities | (10,552,298) | (1,627,258) | (4,465,161) | (1,443,896) |
| Net cash from/(used in) financing activities | 0 | 0 | 0 | 0 |
| (Decrease)/increase in cash and cash equivalents | (3,107,803) | 2,304,306 | (2,226,804) | 1,853,876 |
| Cash and cash equivalents at 1 April | 6,515,031 | 4,210,725 | 4,117,738 | 2,263,862 |
| Cash and cash equivalents at 31 March | 3,407,228 | 6,515,031 | 1,890,934 | 4,117,738 |



Financials

Building Research Association of New Zealand Inc.

Notes to the summary financial statements

For the year ended 31 March 2017

1 REPORTING ENTITY

Building Research Association of New Zealand Incorporated (Inc.), "the Parent", is an incorporated society registered under the Incorporated Societies Act 1908. The address of the Parent's registered office is 1222 Moonshine Road, Judgeford, Porirua.

Summary financial statements for the Parent and consolidated summary financial statements are presented. The consolidated summary financial statements of Building Research Association of New Zealand Inc. as at and for the year ended 31 March 2017 comprise the parent and its subsidiaries (together referred to as the "Group").

Building Research Association of New Zealand Inc.'s primary purpose is promoting scientific or industrial research for the building and construction industry.

These summary financial statements and the full special purpose financial statements were authorised for issue by the Board of Directors on 28 June 2017.

2 BASIS OF PREPARATION

Statement of compliance

The summary financial statements are an abridged version of the full special purpose financial statements. Their purpose is to provide an overview and as such do not provide an understanding as complete as the full special purpose financial statements. The disclosures included in these summary financial statements have been extracted from the full special purpose financial statements.

The full special purpose financial statements have been prepared in accordance with the accounting policies set out within the full special purpose financial statements. The full special purpose financial statements have been audited and the auditor has issued an unqualified audit report.

Basis of measurement

The summary financial statements are prepared on the historical cost basis. The accounts are prepared on a going concern basis.

Presentation currency

These summary financial statements are presented in New Zealand dollars (\$), which is the functional currency of the Parent and BRANZ Limited. BRANZ Pty Limited's functional currency is Australian dollars.

Comparative restatement

Where necessary, comparative figures may have been restated to facilitate comparison and to comply with current year classifications.

3 CONTINGENCIES

The Group had no contingent liabilities as at 31 March 2017 (2016: None).

4 RELATED PARTIES

Building Research Association of New Zealand Inc. charges rent to BRANZ Limited for the use of property, plant and equipment as well as for its share of the Group CEO remuneration costs and other advisory services provided.

BRANZ Limited charges fees for research work and administration services carried out for Building Research Association of New Zealand Inc. BRANZ Limited also charges Building Research Association of New Zealand Inc. for its share of the Group Executive Management Team costs, provision of accounting, IT, support, health and safety, and quality services, and its share of insurance and marketing costs.

All charges are reviewed by the Board on an annual basis.

| Group entities | Country of incorporation | Ownership interest | |
|-------------------|--------------------------|--------------------|------|
| | | 2017 | 2016 |
| BRANZ Limited | New Zealand | 100% | 100% |
| BRANZ Pty Limited | Australia | 100% | 100% |

Financials

5 SEGMENTAL REPORTING

To provide greater transparency to the reader we have provided an analysis of the Group's core business and the National Science Challenge 11 (NSC 11) as provided below:

NSC 11 funds are paid to BRANZ on a quarterly basis by the Ministry of Business, Innovation and Employment. The funds received are held in deferred revenue on the balance sheet until recognised as revenue. Revenue is recognised in the profit or loss at the time expenses are incurred. The deferred revenue is recorded as a current liability as BRANZ has an obligation to return all funding not spent and for which contractual liabilities have not been incurred at the date of termination or finalisation of the contract.

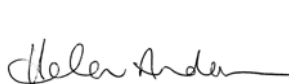
| | Group | | |
|------------------------------|----------------------|---------------------|---------------------|
| | NSC 11 2017 \$ | BRANZ 2017 \$ | Total 2017 \$ |
| Revenue | 3,199,897 | 26,453,624 | 29,653,521 |
| Expenses | 3,199,897 | 23,121,923 | 26,321,820 |
| Surplus before income tax | 0 | 3,331,701 | 3,331,701 |
| Prepaid expenses | 367,811 | 311,092 | 678,903 |
| Deferred revenue | (4,027,328) | (579,700) | (4,607,028) |
| Other net assets | 0 | 41,820,979 | 41,820,979 |
| Net assets/ (liabilities) | (3,659,517) | 41,552,371 | 37,892,854 |

| | Group | | |
|------------------------------|----------------------|---------------------|---------------------|
| | NSC 11 2016 \$ | BRANZ 2016 \$ | Total 2016 \$ |
| Revenue | 368,579 | 24,692,057 | 25,060,636 |
| Expenses | 368,579 | 21,005,081 | 21,373,660 |
| Surplus before income tax | 0 | 3,686,976 | 3,686,976 |
| Deferred revenue | (120,921) | (518,297) | (639,218) |
| Other net assets | 0 | 35,399,336 | 35,399,336 |
| Net assets/ (liabilities) | (120,921) | 34,881,039 | 34,760,118 |

6 SUBSEQUENT EVENTS

No significant subsequent events have occurred after balance date.

These summary financial statements are approved for and on behalf of the Board of Directors by:



Helen Anderson
Board Chair
28 June 2017



Richard Carver
Chair Audit and Risk
Management Committee
28 June 2017



Independent Auditor's Report

To the Members of Building Research Association of New Zealand Incorporated and Group

The summary financial statements on pages 66 to 71, which comprise the summary statement of financial position as at 31 March 2017, the summary statement of comprehensive income, summary statement of changes in equity and summary cash flow statement for the year then ended, and related notes, are derived from the audited financial statements of Building Research Association of New Zealand Incorporated ("Incorporated Society") and Group for the year ended 31 March 2017. We expressed an unmodified audit opinion on those financial statements in our report dated 28 June 2017. Those financial statements, and the summary financial statements, do not reflect the effects of events that occurred subsequent to the date of our report on those financial statements.

The summary financial statements do not contain all the disclosures required for full financial statements under generally accepted accounting practice in New Zealand. Reading the summary financial statements, therefore, is not a substitute for reading the audited financial statements of Building Research Association of New Zealand Incorporated ("Incorporated Society") and Group.

This report is made solely to the Incorporated Society's members, as a body. Our engagement has been undertaken so that we might state to the Incorporated Society's members those matters we are required to state to them in our report and for no other purpose. To the fullest extent permitted by law, we do not accept or assume responsibility to anyone other than the Incorporated Society and the Incorporated Society's members as a body, for our work, for this report, or for the opinions we have formed.

Directors' Responsibilities / Responsibilities of the Members of the Governing Body

The directors are responsible for the preparation of summary financial statements in accordance with FRS-43: Summary Financial Statements.

Auditor's Responsibilities

Our responsibility is to express an opinion on the summary financial statements based on our procedures, which were conducted in accordance with International Standard on Auditing (New Zealand) (ISA (NZ)) 810, "Engagements to Report on Summary Financial Statements."

Other than in our capacity as auditor we have no relationship with, or interests in, the Incorporated Society.

Opinion

In our opinion, the summary financial statements derived from the audited financial statements of Building Research Association of New Zealand Incorporated and Group for the year ended 31 March 2017 are consistent, in all material respects, with those financial statements, in accordance with FRS-43.

The signature 'Ernst & Young' is written in a black, cursive script.

28 June 2017
Wellington

Acknowledgements

Photographs on pages 23 and 42 courtesy of Neil Price, Wellington City Council.

Photographs on page 25 courtesy of Doug Cole.

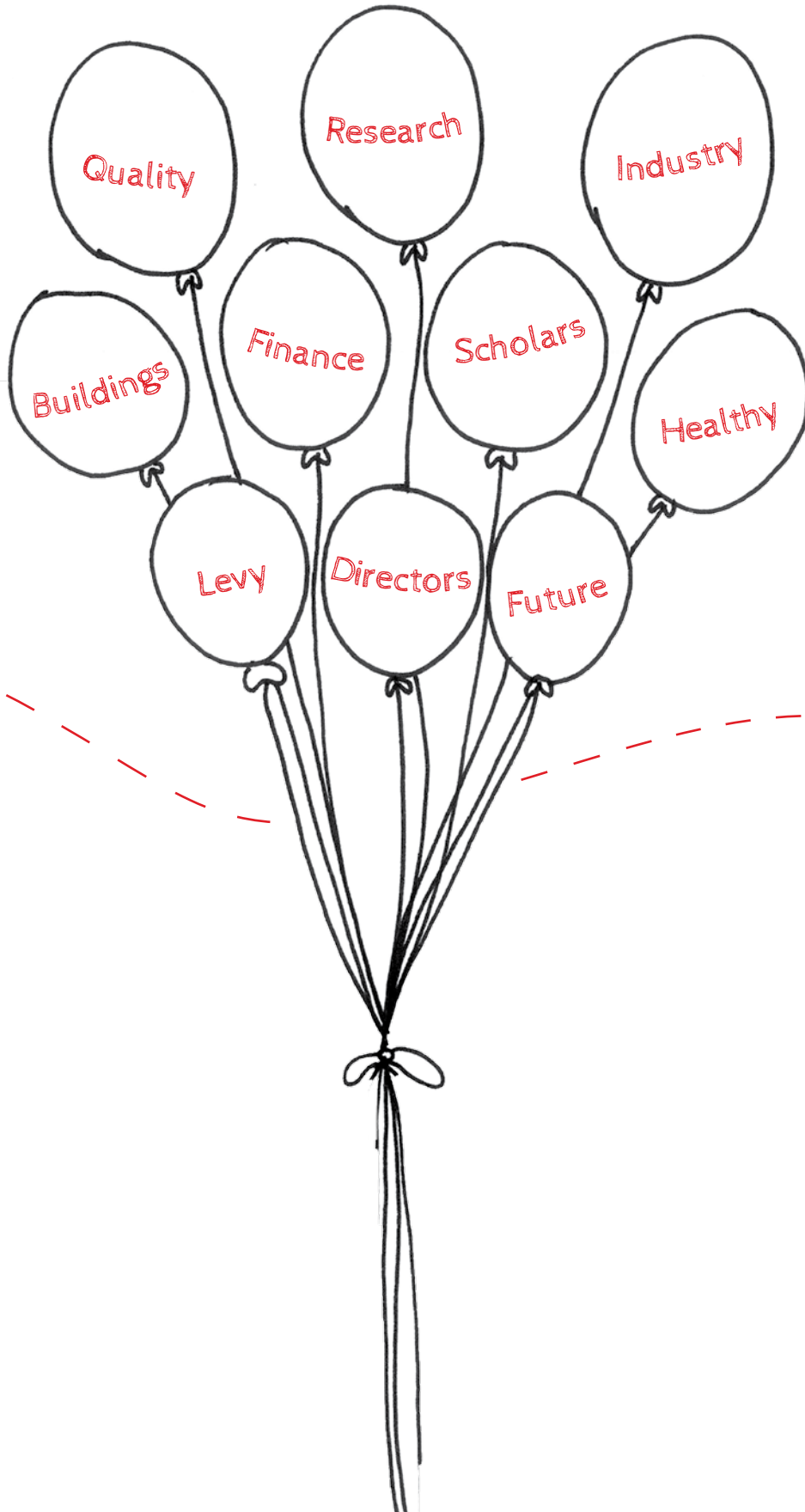
Photographs on pages 40 and 41 courtesy of Simon Wilson.

Photograph on page 44 courtesy of New Zealand Certified Builders.

Photograph on page 46 courtesy of the Cement and Concrete Association of New Zealand.

Photographs on pages 56 to 59 courtesy of Jeff McEwan.

Statistics on pages 8 and 10 from Statistics New Zealand/Ian Page, BRANZ Principal Economist.





We must find time to stop and thank the people who make a difference in our lives.

John F. Kennedy



Our thanks

A huge thank-you to the BRANZ team, who have gone above and beyond this year to deliver the results that make such a positive difference to the industry and New Zealanders. Their extraordinary commitment and expertise never ceases to inspire.

Thanks to the BRANZ Board for the gift of their wise counsel, strategic guidance and tireless commitment to the BRANZ vision during 2016/17.

Thanks to our industry colleagues and thought partners who joined us on the first steps of our audacious journey to unlock transformative change in the New Zealand building sector.

And our thanks to our many clients, partners and collaborators across industry, government, academia and New Zealand communities who made so many of our achievements possible this year.

We have enjoyed working together. We are proud of the results we have delivered. We look forward to continuing this journey with you through the challenges and opportunities of the year ahead.

Inspiring the industry to provide better buildings for New Zealanders

Chelydra Percy
CHIEF EXECUTIVE OFFICER



BRANZ Incorporated

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