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SENTIMENT

INFRASTRUCTURE AND BUILDINGS CONSTRUCTION SURVEY
NEW ZEALAND 2017

IN THIS ISSUE

Is the buildings industry expecting a correction?

How is Auckland coping with the increased demand on its infrastructure?

How is the industry innovating in response to the funding challenge?

Has there been a shift in resilience prioritisation following the North Canterbury earthquake?

THOUGHT LEADERSHIP THAT ADDRESSES
THE BIG ISSUES OF TODAY AND TOMORROW

SENTIMENT

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THE REVIEW

Optimism in New Zealand's infrastructure market remains strong, particularly in Auckland, reflecting the obvious need to continue to invest to meet the growing demand. Confidence in the buildings market has softened, particularly in the investment arm. The exception is the buildings market in Wellington, which reflects a continued sense of optimism.

There is an increasingly positive outlook in the infrastructure market right across the country, with nearly 70 percent of respondents expecting investment levels to remain steady or rise over the next three years. Expectations remain particularly strong in Auckland and have risen by nearly 10 percentage points in Wellington. The optimism may be reflective of the 11-billion-dollar government spend expected over the next four years. This signals a clear commitment to supporting economic growth and development as well as addressing the historical underspend on infrastructure.

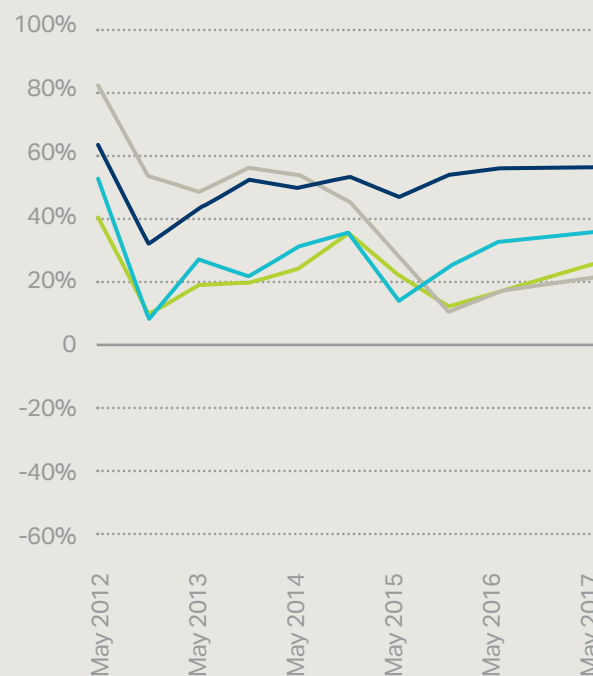
The outlook for the buildings market has eased significantly, with only half as many respondents expecting an increased or similar level of investment this survey as compared to our survey a year ago. Bucking the trend, the improved optimism in Wellington is likely reflective of the need to invest in building stock after the North Canterbury earthquake.

Respondents indicate that issues around funding are becoming of increasing concern: the pressure on the public purse, raising private capital, viability of large projects and the impact of delays in the supply chain. In this report, a new section offers insight into how to address the funding challenges. We look at this at a macro level, with technology and with alternative funding mechanisms.

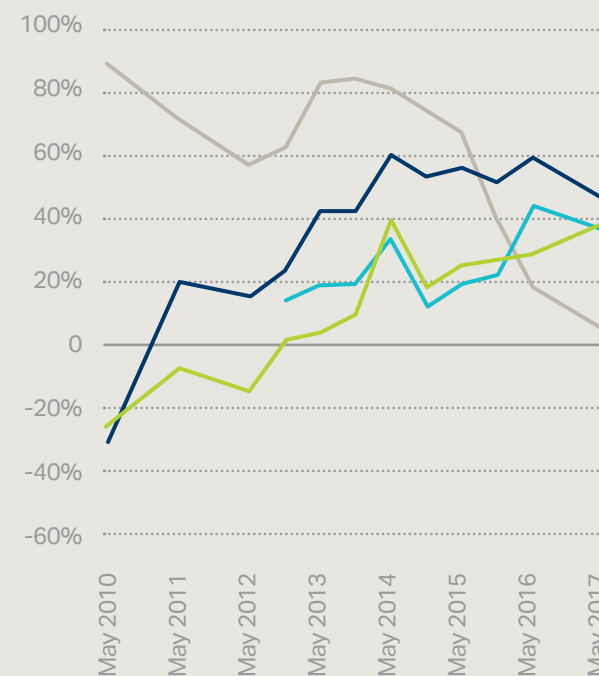
Workload expectations trend



INFRASTRUCTURE MARKET 10th industry survey



BUILDINGS MARKET 16th industry survey

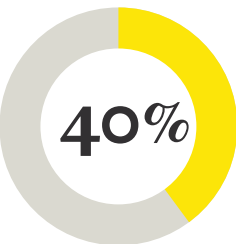


Note: Industry sentiment in the buildings market has been surveyed since 2010, while the infrastructure market and the Hamilton region have been tracked since 2012. This chart shows the trend in net workload expectations.

KEY INDICATORS

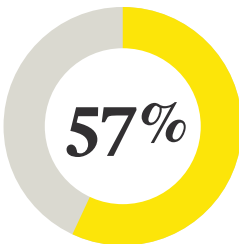
WORKLOAD AND INVESTMENT EXPECTATIONS

Buildings market moderates



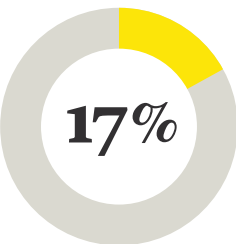
40 percent expect more buildings work across the country, compared to 45 percent previously.

Auckland Infrastructure stable



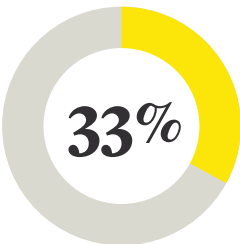
57 percent expect growth in Auckland infrastructure projects over the next three years, up from 56 percent in our 2016 survey.

Christchurch buildings market continues to moderate



17 percent expect increased investment in the Christchurch buildings market over the next three years, down from 29 percent 12 months ago.

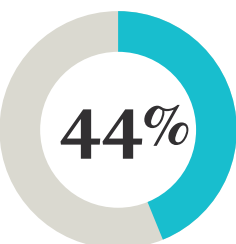
Optimism softening in Retail



33 percent expect to see a lift in Retail development, down from 48 percent previously.

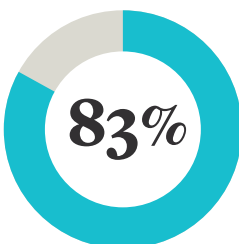
INDUSTRY SPOTLIGHT

Skills and Materials Shortages considered less of an issue for industry



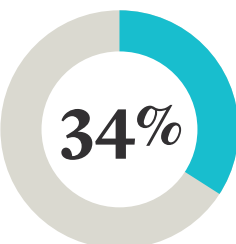
44 percent identified Skills and Materials Shortages as a significant industry challenge, down by 15 percentage points from the results obtained last year.

Further rise in perception of value delivered by Negotiated Contracts



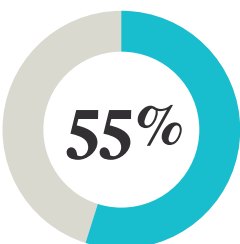
83 percent consider Negotiated Contracts deliver the best value for money, as compared to value delivered by Closed or Open Tendering.

Fewer see big data and technology as driver of change within the next 2–4 years



34 percent expect big data and technology to be a driver of change in business over the next 2–4 years, down from 44 percent a year ago.

Majority understand Value Capture



55 percent of all respondents identified as having a moderate to great understanding of this alternative funding mechanism while 45 percent indicated they had some way to go.

INFRASTRUCTURE MARKET

EXPENDITURE AND WORKLOAD EXPECTATIONS

Positive sentiment across the infrastructure market is strengthening, with the majority of respondents expecting spending within the sector to remain steady or increase over the next three years.

Optimism continued to grow in the investment arm, a trend seen clearly over the past three years. Since our last survey, there has been a jump of 17 percentage points with 68 percent of respondents indicating a positive outlook. This is unsurprising given the growing recognition of the pressure on existing infrastructure and the subsequent impact on people's lives. Migration from big cities into smaller centres is also recognition of issues pertaining to cost and convenience, both strongly correlated with the provision of infrastructure. Certainty around the appetite for a substantial and consistent spend from central government is a likely contributor to the industry buoyancy.

The softening previously seen in the delivery arm has eased, with positivity returning to levels seen two years ago. Nearly 70 percent of all respondents are anticipating growth. This optimism could be attributed to some of the large construction projects getting underway: Transmission Gully in Wellington and City Rail Link in Auckland.

The degree of optimism reported from those working in the investment arm and those in the delivery arms of the market is near uniform. This convergence will improve the ability to match resources to demand. Fundamentally, alignment will increase efficiency across the industry.

In this survey, the investment arm of the infrastructure market has reported the lowest degree of pessimism since the survey began. Just eight percent of respondents expect to see less investment in infrastructure over the next three years. Pessimism continues to remain low in the delivery arm of the industry.



High performing infrastructure is key to both our economy and international credibility. The Government's clear commitment to investing in existing and new projects across the country is evidence of its desire to drive growth, not only in an increasingly dominant Auckland but in the country's unique and diverse regions. The certainty delivered by the recent funding announcement, 11 billion dollars over four years, allows the sector to strengthen the skilled resource pool needed to deliver high quality and value added services.

MARK DRURY
GROUP DIRECTOR – CIVIL INFRASTRUCTURE
AECOM



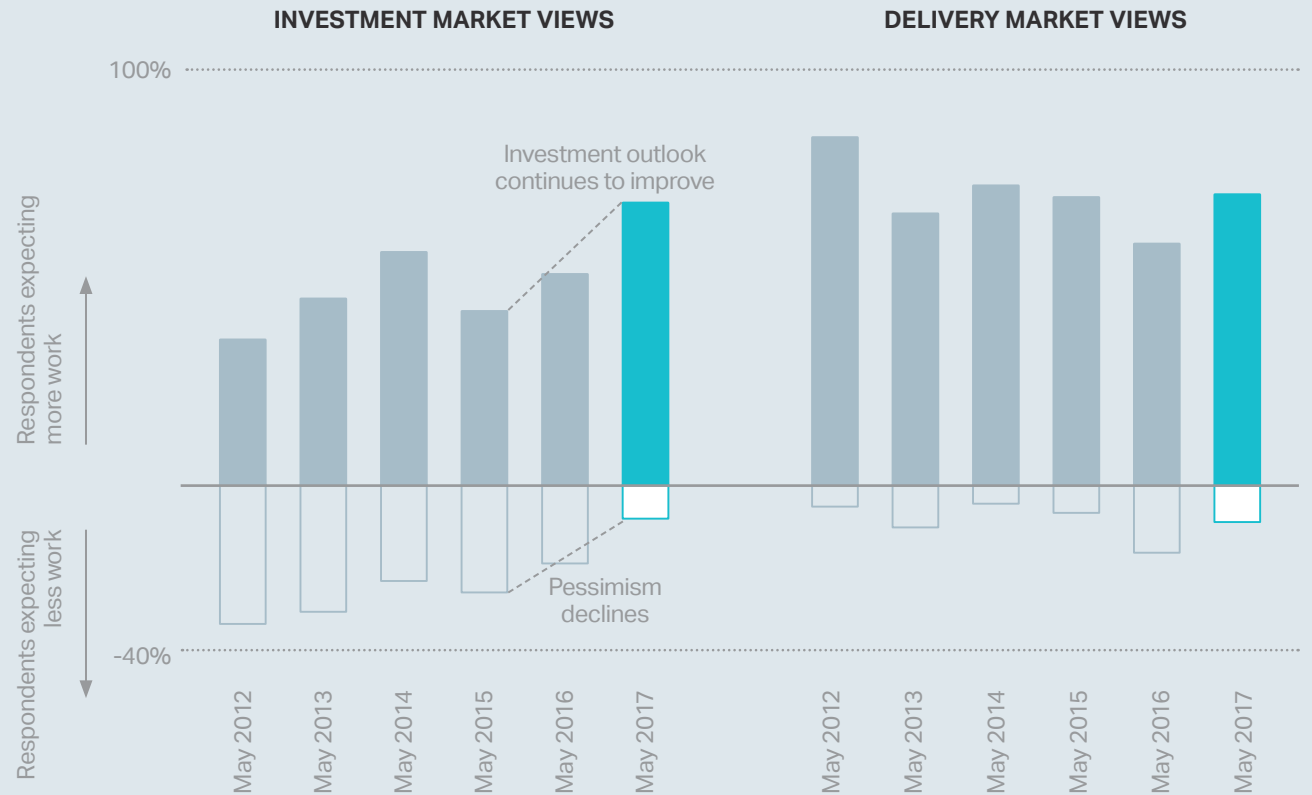
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Rapid population growth, particularly in Auckland, is driving new development in areas without supporting infrastructure. This puts pressure on utility providers to time their investment to align with and support the growth. For the energy sector, advances in alternative storage are challenging the traditional business case for electricity infrastructure roll out. Providers need to weigh up the opportunities inherent in behind-the-meter regeneration, and the possibility of either minimising or deferring the need for upfront capital investment.

ANANT PRAKASH
GROUP DIRECTOR – ENERGY
AECOM



Infrastructure outlook



Note: These measures of improving or declining expectations represent the proportion of respondent views on market direction – not the actual anticipated change in workloads.

WORKLOAD BY REGION AND SECTOR

Infrastructure work expectations remain strong and steady across all regions and sectors.

Optimism has improved in all regions except for Auckland, which has remained stable. The country's largest city remains buoyant, with 61 percent of all respondents anticipating an increase in workload over the next three years. The workload is expected to be dominated by the Aviation, Road and Rail sectors. This reflects the obvious need for investment to manage the booming tourism sector, population growth and subsequent effect on congestion and critical infrastructure, particularly water networks.

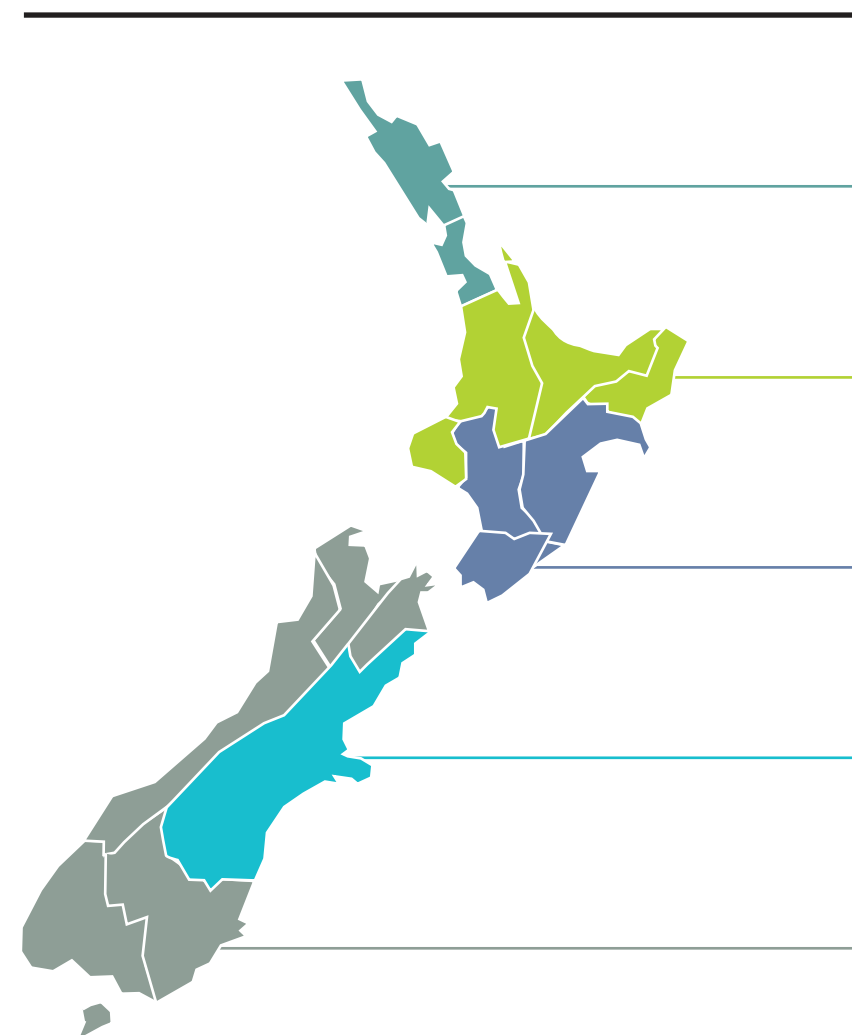
At a national level, the biggest jumps can be seen in Road, Rail, and Water & Marine. This is likely to be reflective of the continued investment in roading, notably between Hamilton and Huntly, and in Tauranga. The investment in the City Rail Link in Central Auckland and the work required in North Canterbury following the North Canterbury earthquakes align with the high workload expectation anticipated in the Rail sector.

Workload expectations in the Wellington region have risen by nearly seven percentage points, with 34 percent of all respondents expecting a period of growth. This is particularly evident in Road, Water & Marine, and Land Development. This outlook is likely impacted by the need to address Centreport, which was badly affected in the North Canterbury earthquakes, and the region's continued focus on resilience and the impact of climate change. The progress evident with the Let's Get Wellington Moving transport system project is also a likely source of optimism, alongside the start of construction on Transmission Gully.

Expectations remain strong in the Canterbury region with 35 percent of all respondents expecting growth, up by nearly five percentage points from our survey a year ago. The significant investment in infrastructure following the Christchurch earthquakes means it will be some time before baseload renewal work hits the market. The optimism may be a result of the impact of the North Canterbury earthquake, with Christchurch-based teams servicing the resourcing requirements for the nearby region.

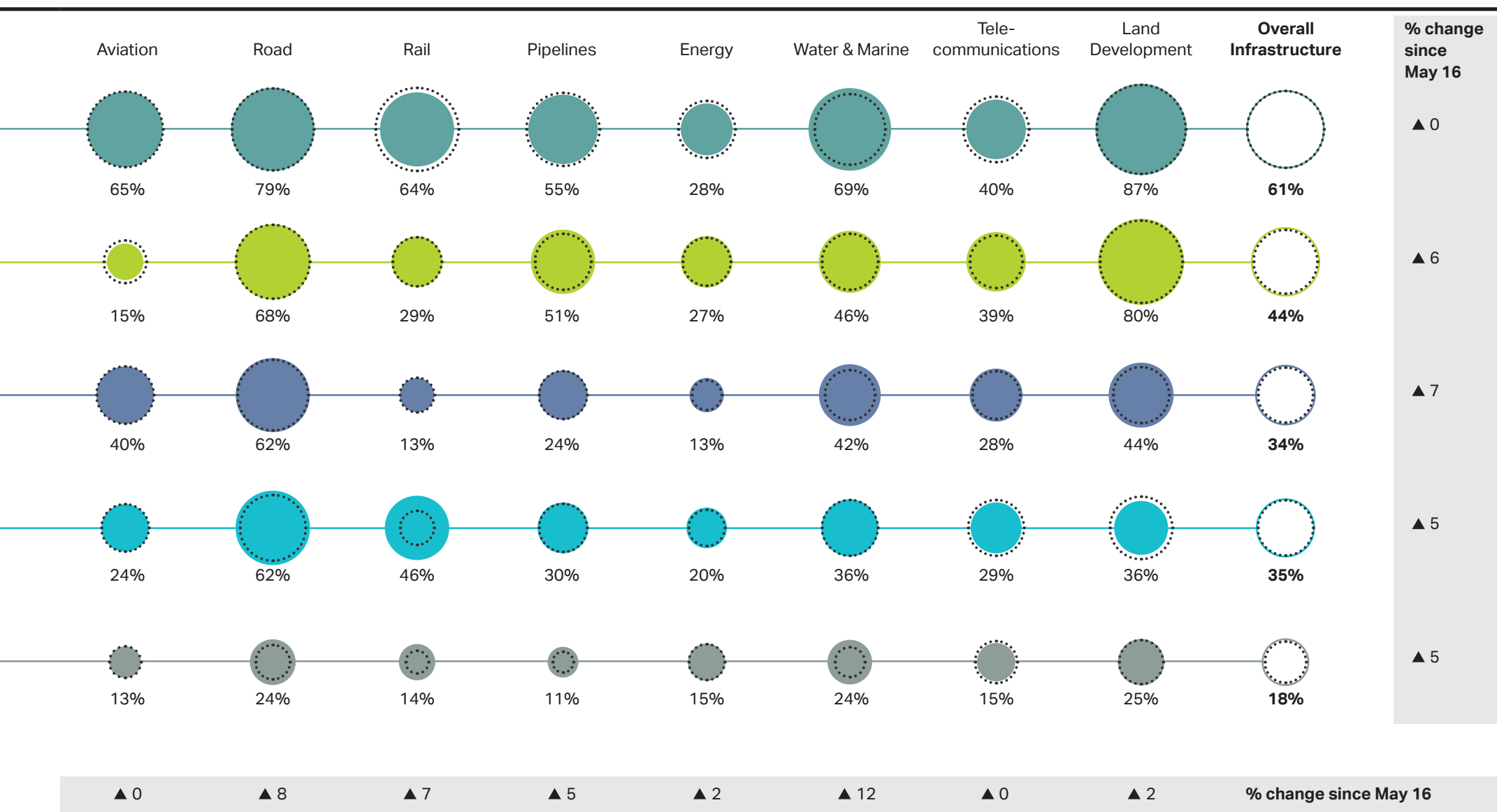
There is some pessimism in the land development market in Christchurch, with optimism dropping by 13 percentage points since our last survey. The focus remains on the centre of town and the former residential red zone; once key decisions have been made the industry will have more certainty.

Sentiment in the Waikato and Bay of Plenty regions continues to reflect the expansion and development of the area. Hamilton City Council is vocal about its growth story, with the Council's investment arm proactively targeting large organisations to set up locally. There has been a jump in optimism in Pipelines (up 16 percentage points, to 51 percent) and Water & Marine (up eight percentage points, to 46 percent). Long term regional plans providing funding for water infrastructure and the public conversations around water quality may be the driver for the positive outlook in these sectors.



Note: Bubbles on page 7 indicate the market optimism for growth over the next year. Dotted lines indicate the May 2016 results.

Proportion of respondents expecting increased investment by region



BUILDINGS MARKET

EXPENDITURE AND WORKLOAD EXPECTATIONS

The buildings market has moderated across the board, but most markedly in the investment arm.

Our 2017 survey has seen a more conservative outlook in the buildings investment space with 32 percent of developers and government bodies in this sector expecting rising investment levels over the next 12 months. This is a drop from the heights seen over the last four years. In 2016, 68 percent of respondents indicated they were expecting growth. Equally stark is the increase in pessimism; 29 percent of all respondents are expecting the workload to decrease.

Workload expectations have also moderated on the delivery side, however the outlook remains strong. This could reflect a lag in understanding of a shift taking place in the market. Among the contractors, consultants and others involved in the delivery of projects in the

buildings sector, 58 percent remain optimistic about an increasing workload. Pessimism remains at similar levels to our survey last year.

The softening of views could be driven by concern around a potential decline in demand as a consequence of changes to immigration policy alongside the high cost to build. Off-shore hotel developer Fu Wah has called for corrective action to stop rising building costs. The group is responsible for the development of the 200-million-dollar hotel on Auckland's waterfront and claim rapidly increasing costs threaten to make the investment uneconomic.

The lack of alignment between the investment and delivery side of the buildings market is cause for concern. With a number of commentators predicting a downturn in the construction market, the current lack of convergence could have unwelcome knock on effects leading to a lack of efficiency.

“

It is possible we can expect a correction to take place in the buildings market, followed by a transition period where contractors and consultants realign expectations to an even more competitive market. This market shift enables an opportunity for the industry to reflect on alternative delivery models, where to allocate risk and how to ensure all suppliers are positioned to deliver and add value. While clients are more aware than ever of the levers they have to deliver their projects, the challenge is for all parties to work together for the best outcomes for the industry.

GRAEME FLETCHER
GROUP DIRECTOR – BUILDINGS + PLACES
AECOM



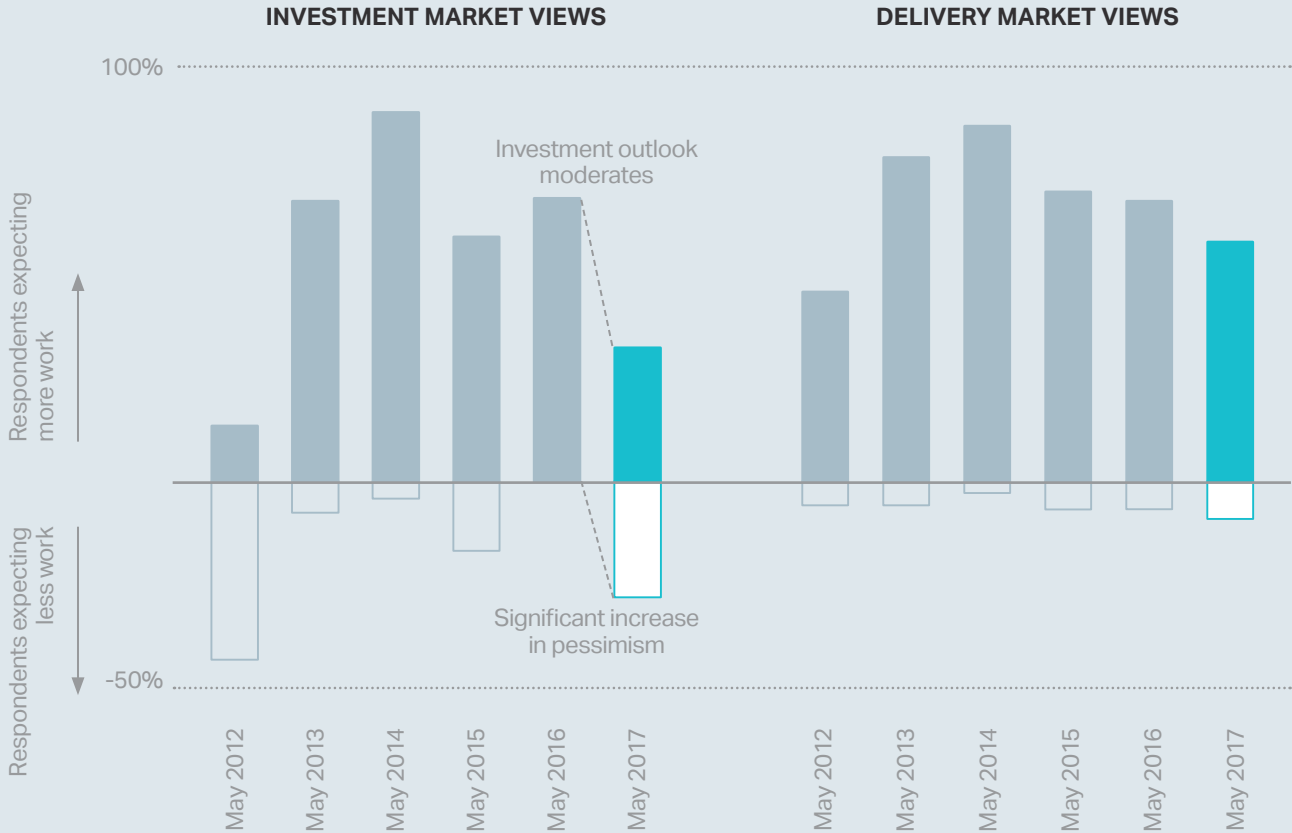
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The downturn expected by the investment arm comes off a period of buoyancy for the sector. The positivity has been particularly high in Auckland, where evidence of a construction boom is visible throughout the city. While those on the investment side will always be ahead of those working on delivery, seeking some degree of alignment will improve efficiency. Of concern is the reshaping and churn being experienced by our top delivery companies, a result of the overheated market we have been working in.

TREVOR HIPKINS
INDUSTRY DIRECTOR, COST MANAGEMENT PRACTICE LEAD,
AUSTRALIA NEW ZEALAND
AECOM



Buildings outlook



Note: These measures of improving or declining expectations represent the proportion of respondent views on market direction – not the actual anticipated change in workloads.

WORKLOAD BY REGION AND SECTOR

Sentiment has moderated within the buildings sector for the majority of regions and sectors. Wellington is an exception to the trend, where forward workload is anticipated, particularly within the Residential, Office and Public Buildings spaces.

Despite a softening, optimism in the Auckland market remains high with 58 percent of all respondents expecting to see an increased workload over the next three years. This is down more than 11 percentage points from our survey a year ago. The fundamental drivers for a building boom remain in place for Auckland but there are growing concerns around the economic viability of projects and the potential for the Government to impact demand through further changes to immigration policy.

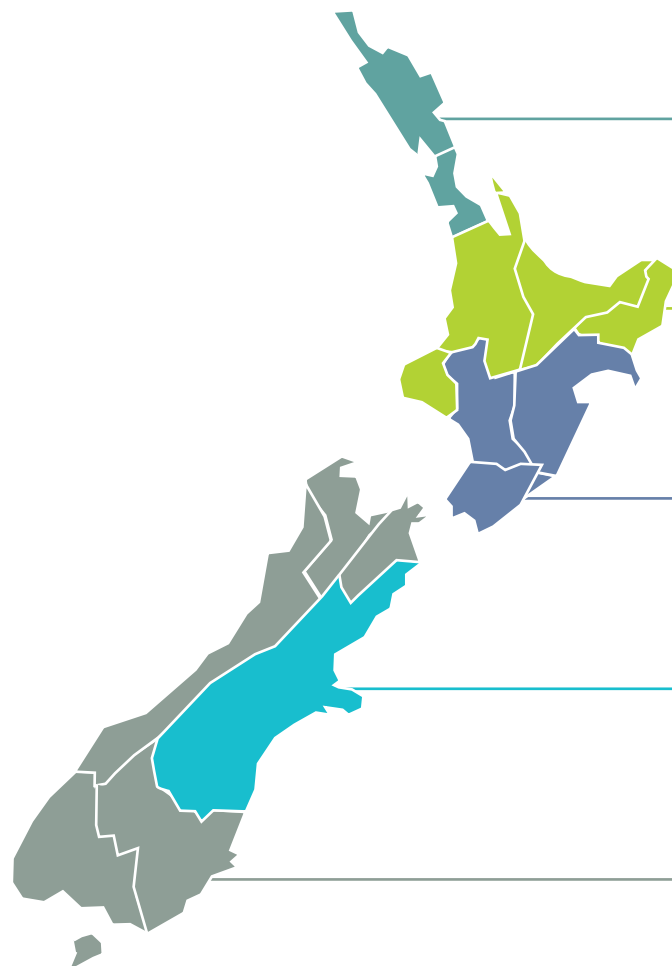
Respondents have indicated a sizeable decline in optimism in the Residential sector in Auckland. In our survey last year, 91 percent of respondents were anticipating a growth in workload over the next three years, compared to 73 percent this year. With a significant shortfall in residential housing stock in the Auckland region, there remains a need for the industry to play catch up after years of under investment.

The buoyancy felt in Wellington is likely to be related to the impact of recent seismic events and the residential accommodation shortage. Damage to commercial building stock is being found in targeted assessments, alongside an already low supply of quality office stock.

The highest degree of pessimism has been recorded in the Canterbury region. Just 34 percent of respondents are anticipating a strong forward workload, down from 46 percent a year ago. The decline could be a function of the stage of the rebuild; new factories have been built, new office stock is available and retail centres are well underway with their repairs and expansions following the Christchurch earthquakes.

At a national level, the downward trend is most noticeable in the Retail and Industrial sectors. Retail has declined by 15 percentage points to 33 percent of all respondents anticipating an increased workload going forward, while Industrial has seen a drop of more than 12 percentage points to 30 percent of respondents indicating positivity. Retail is likely to be feeling the brunt of a combination of the high cost of retail space alongside the disruption of the industry's traditional business model. The cost of labour, particularly in Auckland, may be underpinning the declining optimism for the Industrial sector.

While all councils have to balance difficult funding decisions, there is a growing recognition that with growth comes the need to invest in public realm infrastructure. After a period of low optimism, this survey we have seen an increase in those expecting increased investment in Public Buildings. This is particularly evident in Wellington where 61 percent of all respondents indicated optimism, up from 28 percent in our 2016 survey.



Note: Bubbles on page 11 indicate the market optimism for growth over the next year. Dotted lines indicate the May 2016 results.

Proportion of respondents expecting increased investment by region



INDUSTRY SPOTLIGHT

NATIONWIDE INDUSTRY CHALLENGES

While a shortage of the skills and materials needed to cater for the anticipated workload remains by far the biggest perceived risk, respondents indicate funding issues are a growing concern.

44 percent of respondents highlighted skills and materials shortages as the key challenge, down from 59 percent a year ago, a possible effect of the forecast drop in investment expectations in the buildings sector. However, for a number of respondents the industry's issues with the supply chain and labour force are critical and are visibly impacting current projects. One respondent suggested, on some current major projects, *"these constraints are manifest in [current] project delivery issues"*.

The market has indicated an increasing awareness of interrelated issues: cost escalation and funding. Cost escalation increased by three percentage points, after moderating significantly in the 2016 survey. Funding was identified by 15 percent of respondents as a top industry challenge, an increase of eight percentage points from our survey last year.

Cost escalation, funding delays and broader capital constraints are impacting the financial viability of many private sector projects. This could also be a key influence on the concern around business confidence, which continues to be identified as a key challenge.



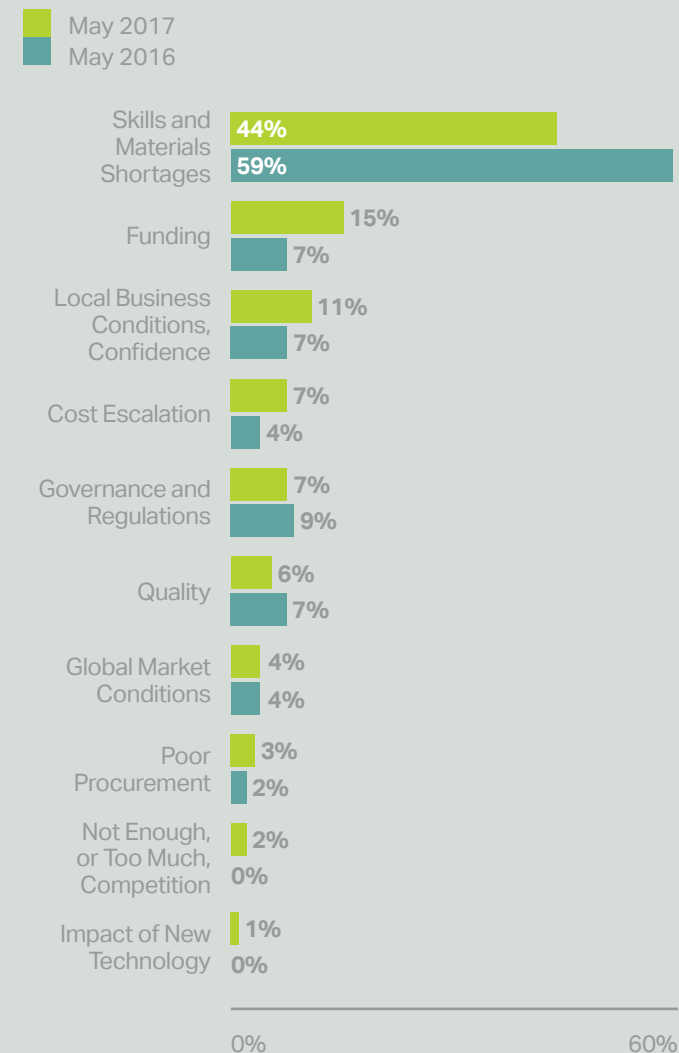
Innovation may be a cliché but there is a reason for that. It is the open market's response to industry-wide challenges – like skills shortages, where we've seen diverse organisations combine in fresh ways to get work done. We are now seeing the market respond to the funding challenge.

Agility has always been a strength of long-term players in the New Zealand construction sector. Those who choose to approach hurdles with an open mind and nimble feet have often been rewarded.

BEN HARDY
GROUP DIRECTOR – CONSTRUCTION SERVICES
AECOM



Top industry challenges



BIG DATA AND SMART TECHNOLOGY

As digital technologies continue to evolve, there is an increasing level of understanding from those working in both public and private organisations of potential efficiencies like cost savings and improved productivity.

Compared to the 2016 survey, the latest findings indicate more respondents consider Big Data and Smart Technology as either a high or very high driver for change – nearly 60 percent of all respondents, compared to just under 50 percent a year earlier. The same trend can be seen in the industry's level of understanding of this hot topic, where 45 percent of respondents indicate a high or very high level of understanding compared to 35 percent in the May 2016 results.

Overwhelmingly, respondents consider there to be huge potential for business in embracing the digital environment. But deciding what and how to implement the technology is not the only challenge. How the data insight is applied and the information subsequently utilised to make decisions is a key step in realising the benefits of digital transformation: *“Data is the new oil; the more you have the more useful it is, but only if you can manage the data and produce outputs that are of value to your team and your clients.”*

“

To harness the benefits of technology, organisations need to implement systems in a timely fashion. The challenge with this is seeking alignment internally and externally. While there needs to be a degree of organisational change to support any digital transformation, it is critical to operate within an industry and policy environment conducive to the required change. Focus must also be applied to how technology and information will impact on the efficiency of an asset or system throughout its lifecycle and therefore an organisation's subsequent ability to make business-critical decisions. This will ensure the right technology is implemented from the outset.

CHRIS BALLANTYNE
DIRECTOR – INFRASTRUCTURE ADVISORY
AECOM



Big Data and Smart Technology considered as drivers for change



PROCUREMENT

Respondents across the infrastructure and construction industry continue to aspire to procurement processes that optimise value, project delivery and whole-of-life outcomes. In line with previous surveys, this year's results indicate a level of frustration around procurement processes that trend towards a price-driven model.

Despite there being relatively little use of Negotiated Contracts as a method for procurement, there's been a steady increase in the perceived value for money of this approach over the past three years. A disconnect may exist between perception of value and use in the marketplace. For one respondent, *"there is a sense that negotiated contracts will cost the client more, however, correctly done it can help achieve a good result"*. Following from Negotiated Contracts, Closed Tendering is seen as the next best option.

Partnership/Alliance and Design and Construct are identified as the most preferred procurement models. While Public Private Partnerships are gaining popularity within the marketplace, respondents in our latest survey perceive them as less able to deliver value than other options.

There is consensus amongst respondents that the industry's continued focus on lowest cost options will sacrifice quality and limit innovation and value-added aspects of a project:

- *"Value comes from looking at integrated solutions that address whole-of-life costs of the infrastructure with a particular focus on getting it 'right' at the start of a project. This means investing more in the project scoping and concept design phase."*
- *"[The] strong focus on lowest cost when combined with limited and delayed project release to market, has led to overly aggressive pricing, combative/adversarial delivery practices, and as a result the suppression of innovation and development of a variation culture amongst consultants."*

More than 80 percent of respondents consider the whole-of-life cost of an asset to either some extent or a great extent when making capital investment decisions. Despite this, a number of respondents indicate that in practice the level of whole-of-life considerations differ extensively between investors and developers.

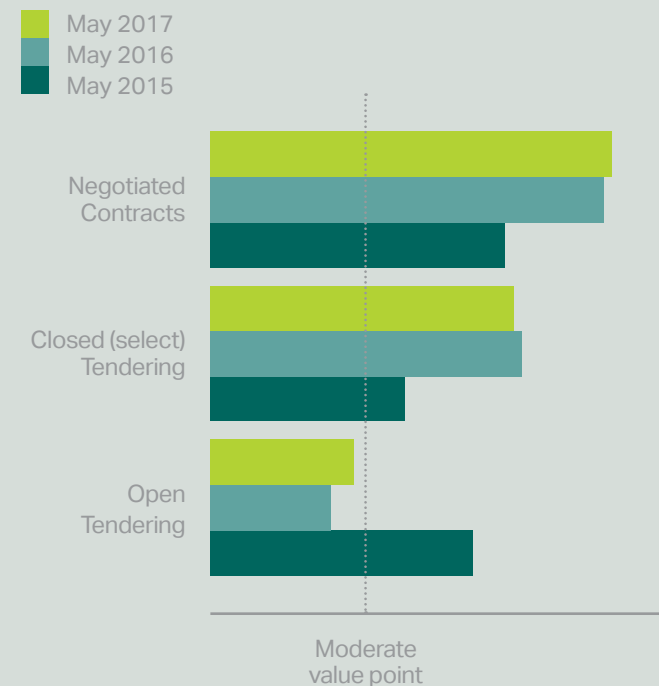


With increasingly complex projects coming to market, an integrated, multi-party and collaborative approach is frequently cited as the best approach. But are we just paying this lip service? The challenging scoping phase of a project is where all parties need to clearly define the desired outcomes, and hence the levers available to achieve them. Informed clients recognise the need to involve a variety of expertise to make those decisions.

JON VARNDELL
DIRECTOR — CIVIL INFRASTRUCTURE
AECOM



Procurement methods by value for money rating



FUNDING INFRASTRUCTURE

The level of investment required to meet the increasing demand for infrastructure continues to increase as population growth, fuelled by immigration, puts stress on assets already under pressure. By ‘sharpening’ our infrastructure funding tools, alternative mechanisms can be used to address the funding gap.

Value Capture is one such mechanism growing in popularity. It recognises that public investment in infrastructure provides landowners with an ‘unearned’ increase in capital value, and seeks to support infrastructure funding by using fiscal mechanisms to capture the ‘gift’ for the public purse. The system is being used successfully in the United Kingdom, the United States and Australia. *(For more, refer to page 19.)*

Results from the May survey highlight that New Zealand’s public and private organisations are divided in their understanding of Value Capture: 55 percent of all respondents identified having a ‘moderate’ to ‘great’ understanding of the alternative funding mechanism while 45 percent indicated they have some way to go.

A number of key barriers were identified as preventing organisations from taking advantage of the alternative funding mechanism:

- Readiness of partner organisations
- Lack of understanding and hence the ability to include it in the financial planning
- An understanding of how to use Value Capture across asset types
- Legislative barriers
- The potential for it to deter investment

Overall, respondents highlight that, while significant progress has been made, we have further work to do to ensure the viability and ease of use of Value Capture in the future.

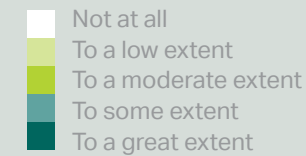


Development and growth inevitably bring challenges; primary among them is securing funding to pay for the supporting infrastructure. It is clear that we need to use the full range of funding options available if we are to meet the infrastructure growth demands and provide resilience in our critical services. In best addressing these complex funding issues, it is imperative we support the development of a collaborative and progressive relationship between the key stakeholders of central government, local government and business.

CRAIG DAVIDSON
MANAGING DIRECTOR — NEW ZEALAND
AECOM



Degree of organisational understanding of Value Capture

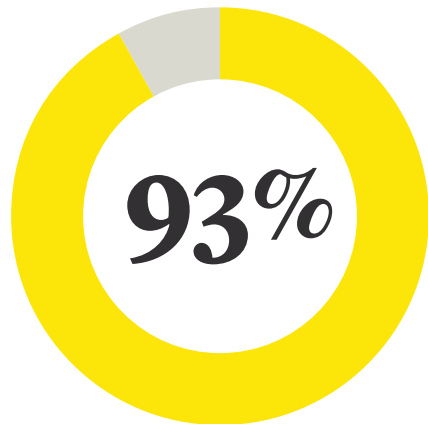


CITIES SPOTLIGHT

FUTURE GAZING

As cities face disruption from the challenges associated with a growing urban population, it is widely recognised that a clear city vision enables city and business leaders, influencers, and citizens, to work cohesively together.

The overwhelming majority of respondents in our latest survey consider it important for a city to have a well-defined, well-articulated and cohesive vision: 93 percent consider a city's vision to be very important while a further 6 percent consider it moderately important. Just one percent of respondents consider it only 'slightly' important or 'not at all'.



93 percent of respondents consider it of high importance to have a clearly defined city vision.

Leadership, master planning and stakeholder management continue to be among the most important attributes in delivering a city vision. Success for one respondent relies on the country's big cities remaining outwardly focused, *"as that is where the investment and trade will come from. They need to focus on amplifying the city's strengths and [in doing so] giving investors and buyers confidence that the city will deliver for them"*. Wellington was identified as a city that has been successful in achieving a vision that encourages inner city living, primarily by supporting the vision with an enabling approach.

An emerging theme is the concern around a sense of compromise associated with a short political cycle. Drivers that support short-term political expediency can compromise all of the attributes needed to execute a vision: *"The willingness to prosecute a long-term vision against short-term self-interest often suffers under the electoral cycle"*. For another respondent 'courageous decision making' will only be achieved if it extends beyond the pattern of three-year thinking. Fundamentally, without political will, desirable but difficult projects are less likely to come to fruition.

THE INFRASTRUCTURE CHALLENGE: MACRO SCALE EFFICIENCIES THROUGH CITY THINKING

When we consider the evolution of modern civilisation, we are currently experiencing one of the most intense periods of urbanisation, placing unprecedented pressure on our cities. This population growth presents increasingly complex problems, but at the same time new technology provides a fresh opportunity to solve these challenges. The sheer scale of tomorrow's cities allows them to benefit from efficiencies not available in yesterday's world.

Doing 'better for less' is no longer just an organisational mantra. Those that seek to optimise their cities are pursuing broad and integrated strategies that take advantage of the opportunities. These tap hidden value, attract people and investment, and overcome financial and operational challenges. The payoff to excelling is high.

Amongst the most pressing challenges facing today's cities is the provision of diverse and affordable housing. The affordability crisis is widely felt in Auckland and is becoming a growing issue in other regions across the country. The drivers of urbanisation will continue to exacerbate the issue, leaving fewer individuals and families able to afford to buy a home.

Getting an understanding of the levers we have to provide more affordable housing is crucial to addressing it. This means adjusting, and innovating, to the new wave of housing preferences. Things like hyper mixed-use development clustered around transport nodes, greater housing choice, more efficient delivery of homes (including prefab or modular technology), and new forms of tenure that either provide greater tenant security or even shared public/private ownership of property.

Future development patterns will also be driven by other factors such as changing work practices, reduced car ownership and urban regeneration around core public services. Creative and collaborative design leaders will lead the charge in reshaping these new development areas,

having to rethink traditional spatial arrangements and taking risks as we transform life-long habits and routines.

Key to successful problem solving at the macro level is ensuring we have the right approach to governance and performance metrics. Traditionally we have solved problems in silos. While this method has delivered good outcomes in the past, the approach is no longer fit for purpose under circumstances of hyper urbanisation. In finding new ways to create and deliver the projects that meet today's needs, we need to address the integration of thinking between constituency, industry and government. New tactics are needed and an urgent embrace of technology to allow for the most efficient and transparent decisions to be made and performance measured. A SMART City is one that uses technology and data analytics to enhance the lives of its people – those that lag in embracing technology will be quickly outcompeted in our increasingly interconnected and global world.

City deals are another governance strategy, supercharging economic growth and productivity with a smarter approach to planning, investment and governance. They are a new way of developing outcome-driven policy and investment for individual cities across all tiers of government, the private sector and community. They address local challenges and maximise local advantages. City deals have been used to stimulate, reinvigorate and kick start economies of all sizes across the United Kingdom and were recently adopted for the first time in Australia.

The forces of urbanisation will continue to make themselves felt. Without doubt, the composition and connectedness of our urban precincts will be critical to economic and social prosperity in the future. It's those cities that take advantage of the opportunities that will get 'better for less'.



JAMES ROSENWAX
CITIES SECTOR LEADER,
AUSTRALIA NEW ZEALAND
AECOM

THE INFRASTRUCTURE CHALLENGE: ADJUSTING THE VALUE EQUATION THROUGH DIGITAL TRANSFORMATION

There is no shortage of new digital technologies that can deliver both cost savings and productivity improvements for infrastructure projects and their ongoing operation and maintenance. Just consider the Internet of Things, Virtual Reality, Machine Learning, Artificial Intelligence, Blockchain and Building Information Modelling (BIM) – to name a few. These are not buzz words; they are the result of significant investment around the globe in research and development. There are endless conferences and an unrelenting amount of social media covering them. However, selecting the right technology is just the start of the digital journey. Digital is both a set of technologies and a way of thinking.

Delivering the desired outcomes requires organisations to develop a deliberate digital strategy. This supports the selection of the right technologies and the ability to extract maximum value from the data insights those technologies deliver.

For example, the rail industry globally is trending towards the increased use of sensors. There is a move away from fixed recording cars toward sensors on operating trains, called Instrumented Revenue Vehicles.

This approach significantly reduces the costs of collecting track infrastructure data and increases the amount of data available to make decisions about infrastructure condition, allowing for more accurate prediction of failure.

This pattern is also occurring in other linear assets such as highways, where many owners and operators around the world are searching for the right technology solutions to deliver these maintenance cost savings.

To take advantage of the right technologies, infrastructure owners may also need to adjust their

thinking. Digital technologies change rapidly and understanding where you are on the digital journey is important. Historically, the focus has been to build physical infrastructure that will support generations, leading to an organisational mindset of 'build to last'. When it comes to digital assets, infrastructure owners must invest with a mindset of 'build for change', allowing for rapid and ongoing change to occur.

BIM for linear assets is a great example of where there is a need to invest, but to be prepared for ongoing change. BIM relies on objects that for buildings are well defined in regards to classifications systems and open object standards. But for linear assets such as roads and railways the standards are still being developed. In the interim, organisations need to develop these objects and be ready to refine these objects as standards mature. Collaborating within a common object library would reduce effort and increase efficiency. The NBS National BIM Library (nationalbimlibrary.com) is a good example.

If we zero in on just one area – transport – we see a number of digital strategies that successfully utilise the technology now available. Transport on Demand, Connected Journeys, Autonomous Cars, and Road User Pays programmes will have a profound impact on the future of transport system design as well as ongoing operations and maintenance. This is just one area that highlights how well-defined and executed digital strategies, alongside the associated investment in digital assets, have the potential to result in more liveable and productive cities.



COLETTE MUNRO
CHIEF DIGITAL OFFICER,
AUSTRALIA NEW ZEALAND
AECOM

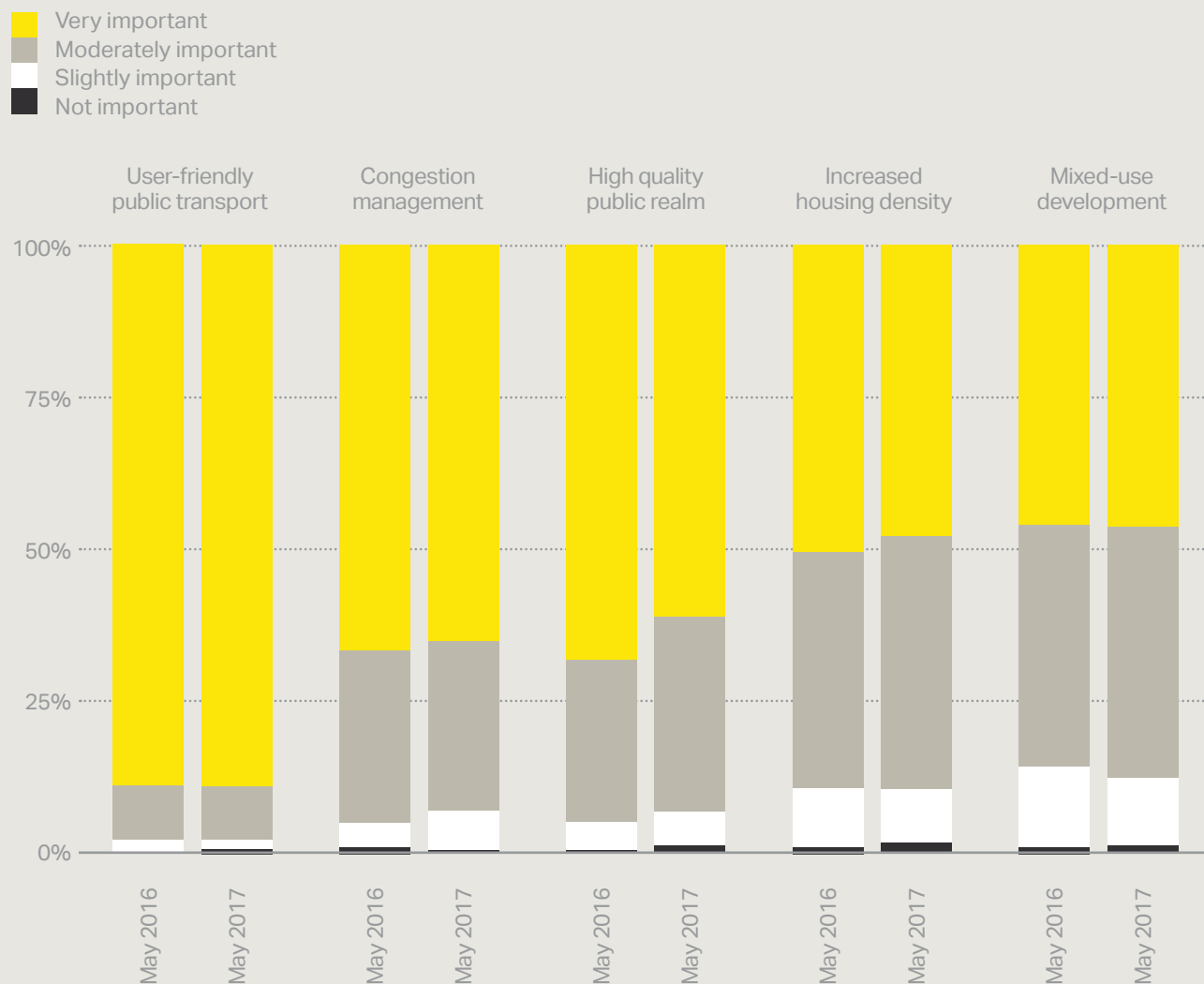
CONNECTED CITIES

Keeping competitive in the global race for talent and investment requires cities to meet the growing expectations of what constitutes the urban landscape. Increasingly, citizens expect more than just the perfunctory aspects of a city, instead looking for spaces and places that improve their quality of life.

User-friendly public transport and congestion management remain the most pressing priorities as we seek to create connected cities. A focus on travel systems that discourage car use is an overwhelming priority for a number of respondents. Dedicated, accessible and safe walking and cycling facilities remain top of mind, as does a cohesive public transport network: *“An interconnected public transport system that integrates air, sea, train, bus, cycle and walking”*.

A high-quality public realm is also high on the list of desired features respondents want to see incorporated into the development framework and future placemaking in New Zealand cities. There is increasing recognition that the way we design and construct our cities affects the way we commute, work, exchange ideas, play, socialise and interact with each other. *“Creating the opportunity for people to live, work and play in their local area is critically important.”* The importance of the public realm grows when cities increase housing density. Investment in these areas needs equal consideration as the public’s expectation for higher quality facilities increases in line with global trends.

Priorities for creating connected cities





Improving connectivity with user-friendly public transport requires long-term planning to protect strategic corridors. Recognising the need, our transport authorities are investing in route protection processes spanning periods of 20 years and more. We have the opportunity to further capitalise on this investment through the use of Urban Development Authorities, capturing the value to fund and create high-quality public realms. These are the things that could be differentiators for New Zealand as we seek to attract investors in the increasingly competitive global market.

CRAIG HIND
TECHNICAL PRACTICE LEADER —
ENVIRONMENTAL PLANNING
AECOM



THE INFRASTRUCTURE CHALLENGE: CREATING BEST VALUE OUTCOMES THROUGH ALTERNATIVE INFRASTRUCTURE FUNDING MECHANISMS

Well-planned and functional public infrastructure is the foundation of our society, contributing to productivity, quality of life and economic prosperity. But delivering smart infrastructure investment is challenging city leaders and governments across the globe. As a result, increasingly innovative funding methods are being sought.

Value Capture is an alternative funding method that allows public agencies to capture some portion of the uplift in land value from those owners who are directly benefiting from major public infrastructure investments and large-scale land zonings. Billions of tax payer dollars are being put at risk by local authorities and governments who are failing to adopt these innovative funding models. The unintended beneficiaries of these projects, such as property owners located close to a new train station, receive a substantial unearned and untaxed financial windfall, effectively subsidised by the public. If this funding was ‘captured’, it could repay loans or infrastructure bonds that have been used to fund the project.

The principle that beneficiaries, such as property owners and developers, contribute an equitable share of the value they receive from a public investment is an important attribute of Value Capture methods. In their most direct applications, Value Capture methods do not increase tax rates, although they are frequently combined with market value-based user charges. This allows policy makers to balance funding sources between unintended

direct and indirect beneficiaries on the one hand, and the other stakeholders and users serviced by the investment on the other.

Value Capture programmes have been widely used in North America for decades, and are now being adopted in the United Kingdom and Australia. In London, the NZ\$29.6 billion Crossrail project is utilising a two percent business rate supplement (BRS) on large commercial properties to finance \$7.6 billion or 26 percent of the overall project cost.

In March, The Productivity Commission released a report examining New Zealand’s existing urban planning system and what it could look like in the future. The *Better Urban Planning Report* highlights the importance of efficient funding mechanisms for infrastructure and acknowledges that funding, financial, legislative and political-economy barriers are impeding the efficient provision of infrastructure in New Zealand. It also provides the framework for a public debate around Value Capture. Given Value Capture funding methods present a fair, equitable and efficient option to help pay for critical infrastructure, the report recommends that new Value Capture mechanisms should be considered. Value Capture methods such as the sale of development rights, hypothecating incremental tax revenues and introducing more effective land tax measures will compensate local and central government for infrastructure provision that cannot be met by existing measures.

Well-conceived and implemented public projects can increase land values by up to 50 percent. The extent of the uplift depends on a number of factors: the nature of the infrastructure, the proximity of the property in question, accessibility and urban design amenities. As we continue to invest in infrastructure to support regional growth, we need to be aware of the potential financial

windfall we gift to property owners and speculators under current funding mechanisms. It just doesn't make sense when there is a tried and tested way of leveraging this value to reduce the overall cost to all taxpayers. Embracing Value Capture, as part of a range of innovative financing mechanisms, will enable best value outcomes as we deliver the necessary infrastructure that will make living, working and doing business around the country easier. It's time to sharpen our infrastructure funding tools.



—
JOE LANGLEY
TECHNICAL DIRECTOR —
INFRASTRUCTURE ADVISORY, AUSTRALIA
AECOM

RESILIENT AND SUSTAINABLE CITIES

The industry has maintained its positive shift towards increased consideration of resilience and sustainability in current investment planning. Natural Disasters and Climate Change are becoming more of a consideration, while there has been little change in respondents thinking around Technical Failure.

67 percent of all those surveyed consider Natural Disasters to either some extent or a great extent when planning for investment – up five percentage points from our survey a year ago. Less consideration is given to Climate Change, where 36 percent of respondents apply the same level of focus. Of note, the number of respondents who give no consideration has decreased across the board.

The increase in consideration, particularly around Natural Disasters, is likely reflective of the widely felt impact of the North Canterbury earthquake. However, a number of respondents pointed out the need to manage the desire for short-term solutions based on recent experience. One respondent warned against “*knee-jerk reactions to natural events*”, recommending extant processes be utilised to provide a consistent and agreed upon approach.

Striking a balance between consideration of resilience and a pragmatic approach to investment was also identified as a key issue. For one respondent, the focus of investment in resilience of critical infrastructure needed to be “*on a broader risk spectrum without falling in to the trap of simply focusing on seismic risk. A modern building without sprinklers is more likely to burn down than be severely damaged by an earthquake*”.

“

As we seek to invest in the safeguarding of our infrastructure and communities, we must continue to look further than the immediate shocks. While the recent North Canterbury earthquake is fresh in the minds of many, the challenge for us all is to continue to prioritise efforts that address longer-term stressors, including the more insidious effects of climate change.

The challenge that gradual climate change poses is not insignificant. Particularly when decision makers address the complex questions of how and when to act, and, of course, who pays.

—
PETER HARTLEY
GROUP DIRECTOR — ENVIRONMENT
AECOM



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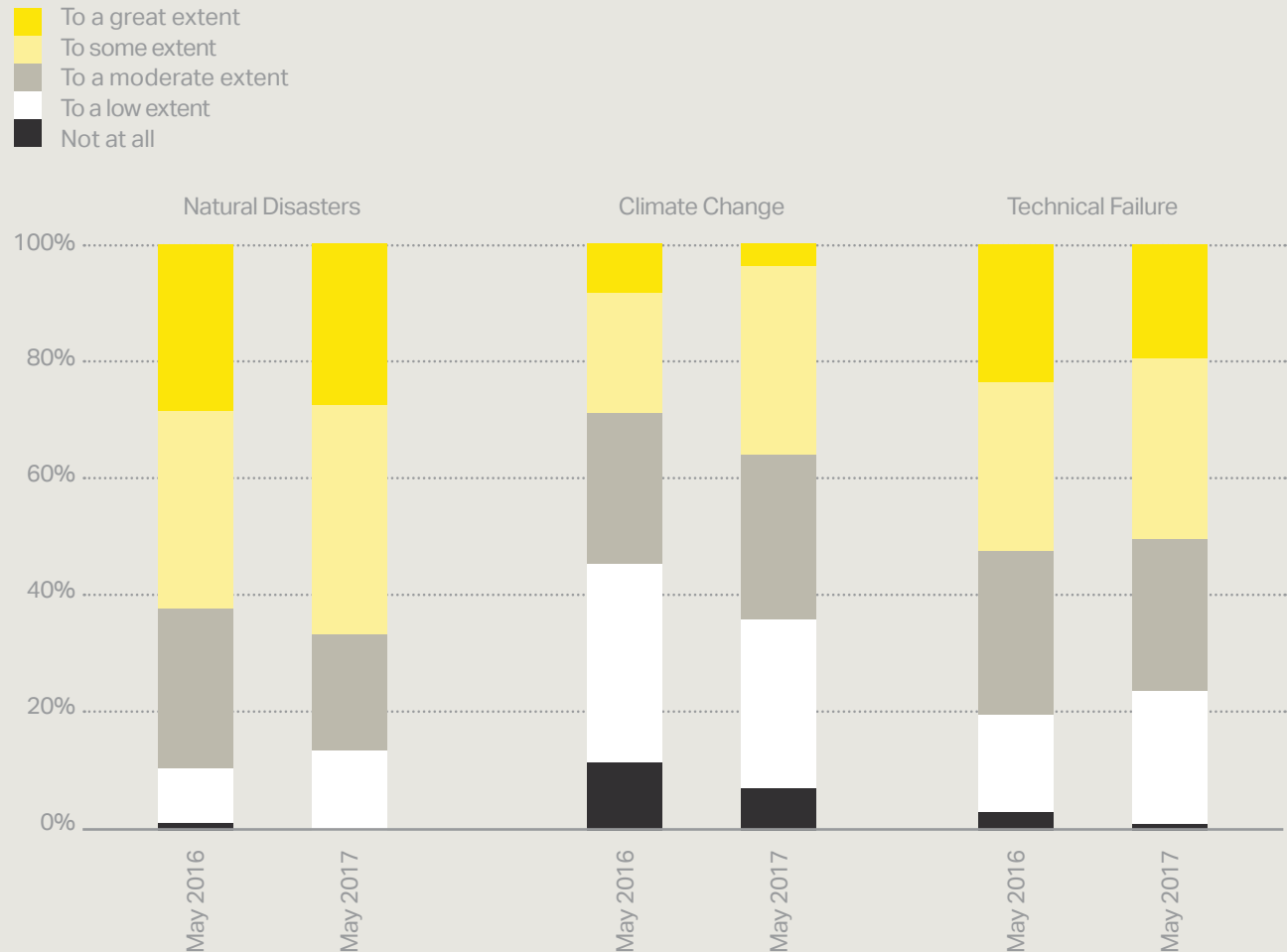
Those cities that successfully design with resilience and sustainability at the forefront of their thinking, will also improve the quality of life of their citizens.

These vital principles are essential to supporting cities to manage the many physical, social and economic complexities and challenges of today's world. With smart planning and design will come payback that will be seen for generations to come.

KERRY GRIFFITHS
TECHNICAL DIRECTOR – SUSTAINABILITY
AECOM



Consideration of resilience in buildings and infrastructure investment planning



REGIONAL SPOTLIGHT

FOCUS ON AUCKLAND

The Super City scorecard

New Zealand's biggest city is in growth mode, with its population projected to hit two million people by 2033. This puts pressure on all aspects of the Auckland industry from the planning, funding and delivery of critical infrastructure to the provision of public service. We asked respondents how they'd rate the performance of the Super City and where industry sees an opportunity for improvement.

The majority of respondents have rated the overall performance of the Super City as 'average' or above. While we have seen a steady level of satisfaction reported, of note this survey no respondents rated the Council's performance as 'excellent'.

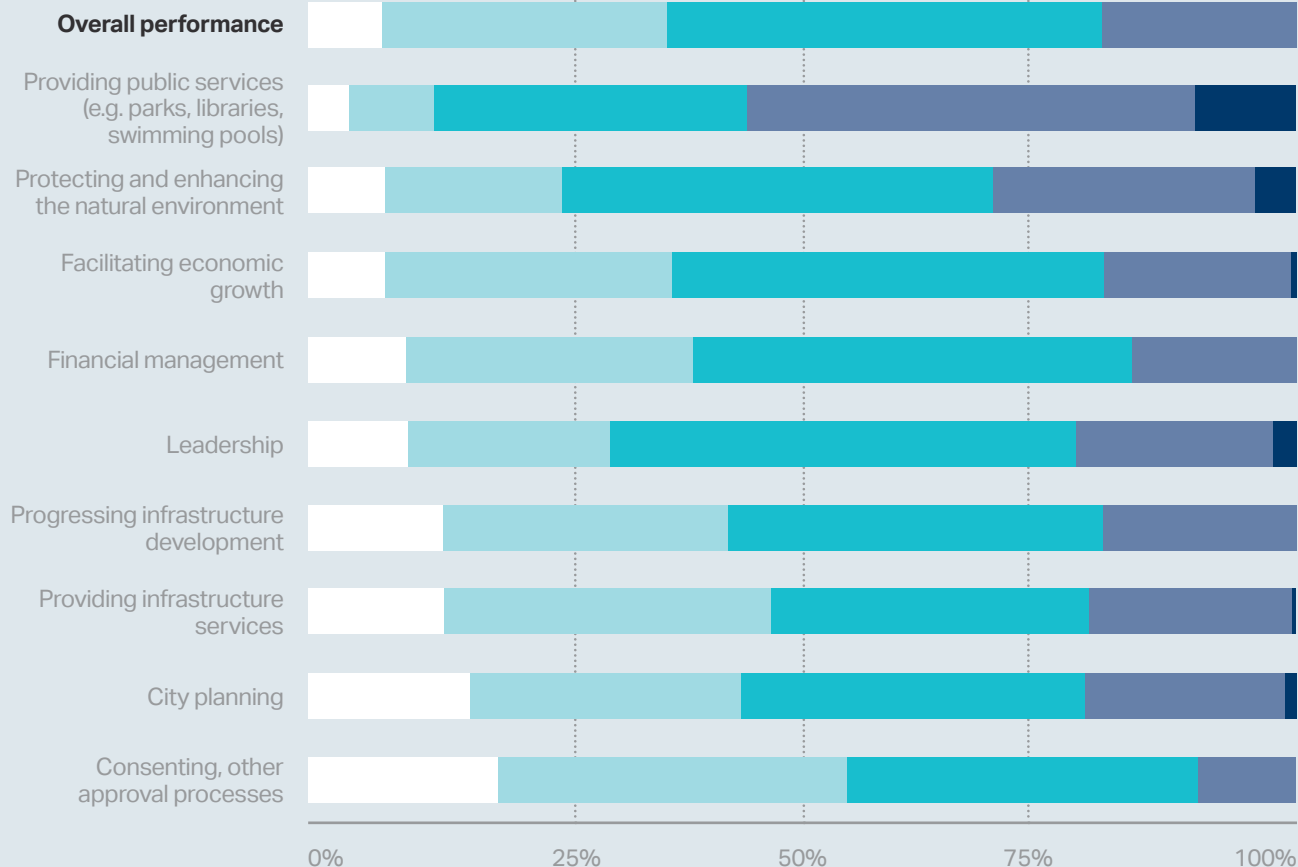
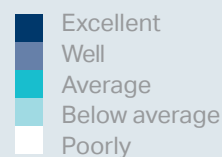
Financial management and Leadership were identified as areas where there have been big improvements. Notably, nearly 70 percent of all respondents rated the Council's Leadership as either 'average', 'well' or 'excellent' – a jump of 15 percentage points.

Providing infrastructure services, City planning and Consenting and other approval processes were seen as the worst performing areas of the Council.

Many respondents acknowledged the pressure on the city, with several suggesting the Super City is not equipped to deal with the magnitude of the problems on its own:

- “Government is not addressing Auckland's major issues that are totally predictable due to high population increases. The Super City is not at fault.”
- “The Super City cannot be all things to all people. It needs to prioritise five deliverables and stick to them.”

Auckland Super City scorecard



Auckland housing

Auckland rates among the worst in the world for housing affordability, rubbing shoulders with the likes of Sydney, Hong Kong and Vancouver. As business, community organisations and central and local government all grapple with the issue, bringing a variety of solutions to the table, the average Auckland house has now topped a million dollars. New developments have been proposed and areas rezoned to allow for high-density builds, but demand continues to outstrip supply – with media coverage at every turn.

The key element in meeting Auckland’s housing challenges, according to survey respondents, is to continue to create an environment that supports high-quality urban intensification and diversity in housing size. Of note, fast-tracking consents is considered to be one of the most important key factors to increasing housing supply, but it is viewed as one of the Council’s worst performing metrics.

A number of respondents commented on the need to change entrenched community attitudes to higher density living. *“Reduce the expectation on young couples that their first home is a quarter acre in the suburbs. Other cities – like Sydney, and Singapore – have a much higher rate of apartments as a first home.”* High building costs were also cited as a reason why more people weren’t choosing central apartment-style living; *“It’s still too easy and affordable, on a world scale, to live in the outer suburbs.”*

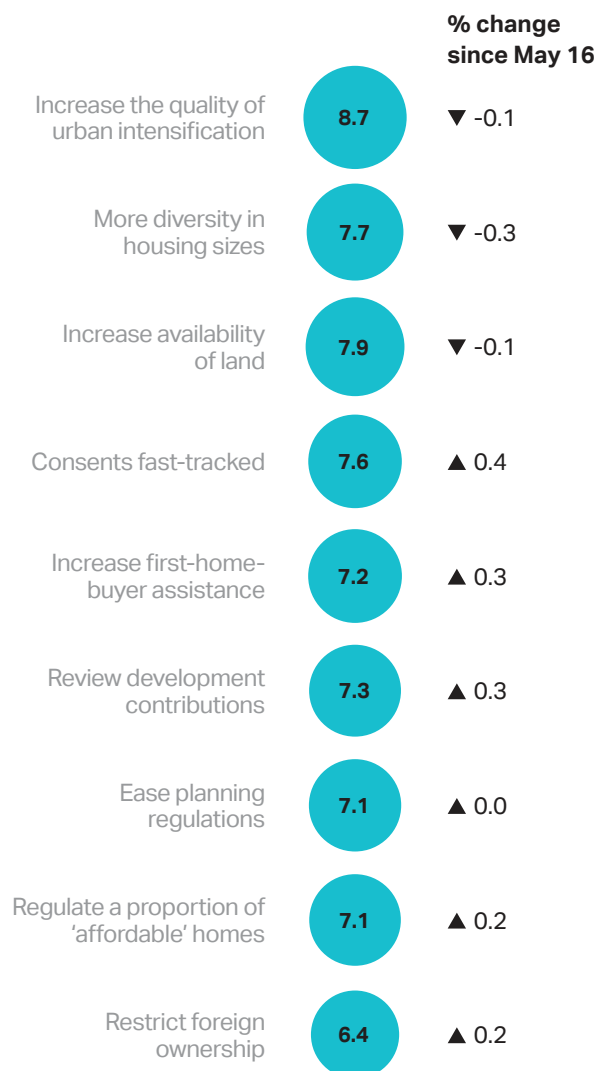
Concern was raised around the impact of housing prices on those working in core services. *“In highly developed large cities, where it becomes too expensive for key workers such as police and teachers to live in the core, a ratio of affordable homes has to be included in the new developments in set areas.”*

While respondents indicate increasing the availability of land remains an important step in improving the supply, several respondents warned against pursuing subdivisions prior to the development of supporting infrastructure and transport options. For one respondent, *“density should be encouraged in areas where existing infrastructure has adequate capacity to avoid delays in supply”*.

Respondents also commented on how current policy measures, like loan-to-value (LVR) restrictions, were helping to meet the housing challenge. Overwhelmingly, respondents felt that LVRs hadn’t had the desired effect:

- *“LVR has locked out first-home buyers but not slowed down investors. Taxing differently when people own [multiple] homes would help slow the market down.”*
- *“LVR moves have softened some investment but not dampened the market significantly.”*
- *“LVRs restrict who can buy the property rather than directly controlling the value of the property.”*

Key factors to help meet Auckland’s housing challenge



Note: Bubbles indicate a rating scale out of 10.

Auckland infrastructure funds

The population growth in Auckland alongside recent weather events continues to highlight the stress being felt by the region's infrastructure. Many of our services are reaching critical points in their lifecycle and require steps be taken to ensure the city is appropriately serviced in years to come.

Respondents were asked whether industry, governments and the community were working well together to ensure the right decisions are made for Auckland's progress. Precisely half of all respondents considered the decision-making process for infrastructure priorities to be either 'moderately', 'somewhat' or 'extremely' effective.

The latest survey indicates an increased appetite for taxation as a means to fund infrastructure, a 14 percent increase in support for Income tax and 16 percent increase in support for Special purpose infrastructure tax. Toll roads were highlighted by a number of respondents as an effective way of both funding roads and reducing congestion. Income tax and the selling of assets are viewed as the most polarising options to fund infrastructure.

Funding decisions for any single project often come down to timeframes around the payoff and the amount of debt an asset owner can carry on their balance sheet. However, for many respondents, variety in funding approaches would help the city meet its infrastructure needs:

- “A combination of all revenue generation opportunities is required, if Auckland is to truly realise its potential.”
- “All options should be used to spread the funding across all user groups.”

“

Emphasis must remain on investment in dependable and resilient critical services. Alongside building new assets, optimisation of existing infrastructure is a key mechanism to get greater efficiency out of what we already have.

To achieve this, the city must be clear about what we have, what we need, and what we will need in the future. Innovation in funding options is critical to ensuring we can resource the necessary changes.

ALICE CHAPLIN
DIRECTOR – PROJECT DELIVERY
AECOM



Funding Auckland's infrastructure



FOCUS ON WAIKATO AND BAY OF PLENTY

The Waikato and Bay of Plenty regions continue to experience strong economic growth. The residential property boom continues in Hamilton; over the past year the average house price has increased by 17 percent, while the city has recorded its highest ever volume of new dwellings. Tauranga was the strongest performing area in the country over the past year, with population growth and a number of businesses relocating to the city contributing to its strong economic profile.

Overwhelmingly, respondents see property investment as a result of the heated Auckland market as having the largest influence on the region's growth; 90 percent saw it as either a 'moderate' or 'strong' influence. When asked if the trend of Auckland property investors looking to the Waikato and Bay of Plenty regions was likely to continue, 96 percent of all respondents said it was likely to 'increase' or 'remain the same'.

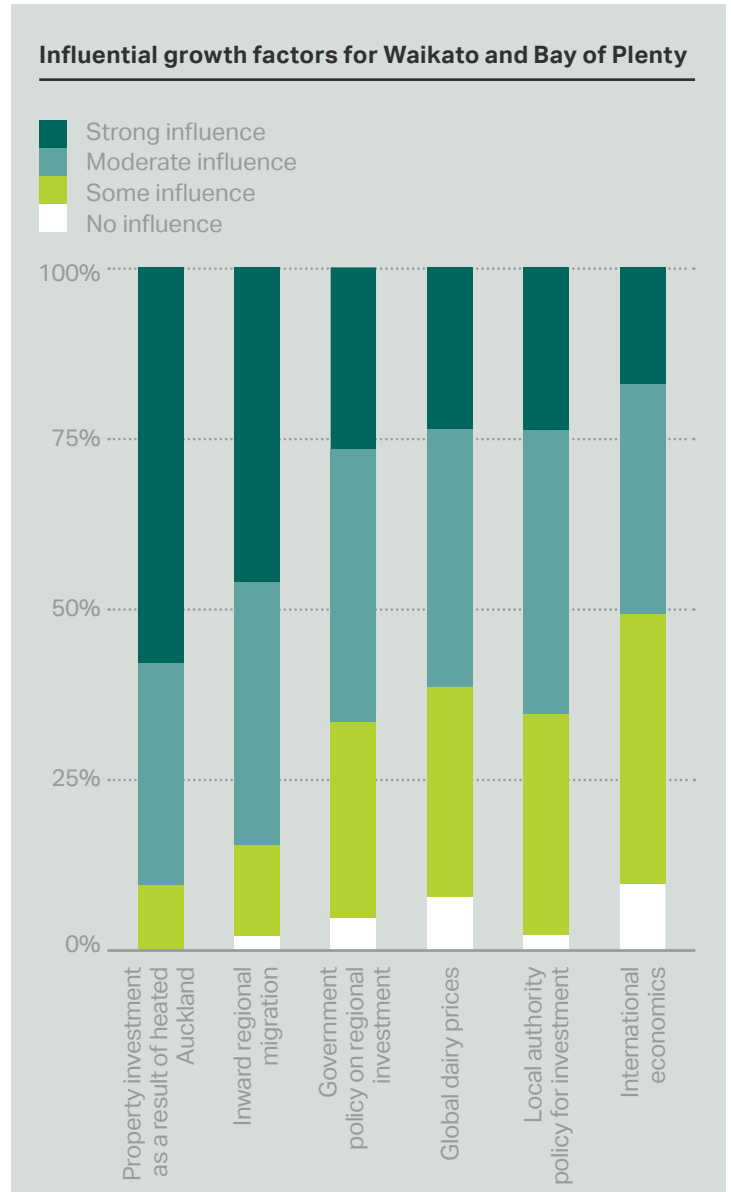
The improvement in transport infrastructure and the maturing economic market were also seen as factors in regional growth. Several respondents commented on the benefits of a move away from the historically heavy reliance on dairying in the region.

In line with results a year ago, respondents want local authorities to continue to prioritise investment in infrastructure and planning to support growth. Recognising this, the region's councils are beginning to consider innovative approaches to funding infrastructure and amenities, including submitting bids to the Housing Infrastructure Fund.

“

We continue to see the trend of private citizens and business owners relocating to Hamilton and Tauranga. Supported by the commuter belt, the region's distinct and diverse offering is increasingly appealing to individuals, and local leaders are becoming more coordinated in selling the opportunities for businesses. The challenge for industry is to manage the demands on the infrastructure and buildings market while benefiting from the influx of skills into the wider region.

NATASHA RYAN
AREA MANAGER – WAIKATO AND BAY OF PLENTY
AECOM



FOCUS ON WELLINGTON

Wellington is continuing to show signs of renewed optimism. The sense of buoyancy is reflected in the growing residential accommodation shortage and the dramatically increasing house prices, particularly over the past 12 months.

Respondents were asked to consider any barriers to economic growth and development in the region. While the Cost of development was seen as significant in our 2016 survey, with 40 percent of all respondents indicating it to be a 'strong' influence, the latest results have just 19 percent indicating the same level of concern. In contrast, 85 percent of respondents see issues around Seismic resilience as having either a 'moderate' or 'strong' degree of influence on progress.

Following the North Canterbury earthquake, there's been a large increase in the number of respondents who believe that Wellington is not prepared for a catastrophic earthquake. In last year's survey, 34 percent felt the region was prepared to either a low extent or not at all, however our latest survey showed an increase of 20 percentage points to 55 percent.

While a number of respondents highlighted the vulnerability of Wellington – particularly the central business district – and the sense of uncertainty around where failure may occur, others felt that despite the unpredictability of earthquakes in size and location, Wellington had taken steps to address any potential fragility. One respondent pointed out that *“compared to any other city in New Zealand, Wellington has put a lot of time and effort into strengthening its buildings and to build up resilience”*.

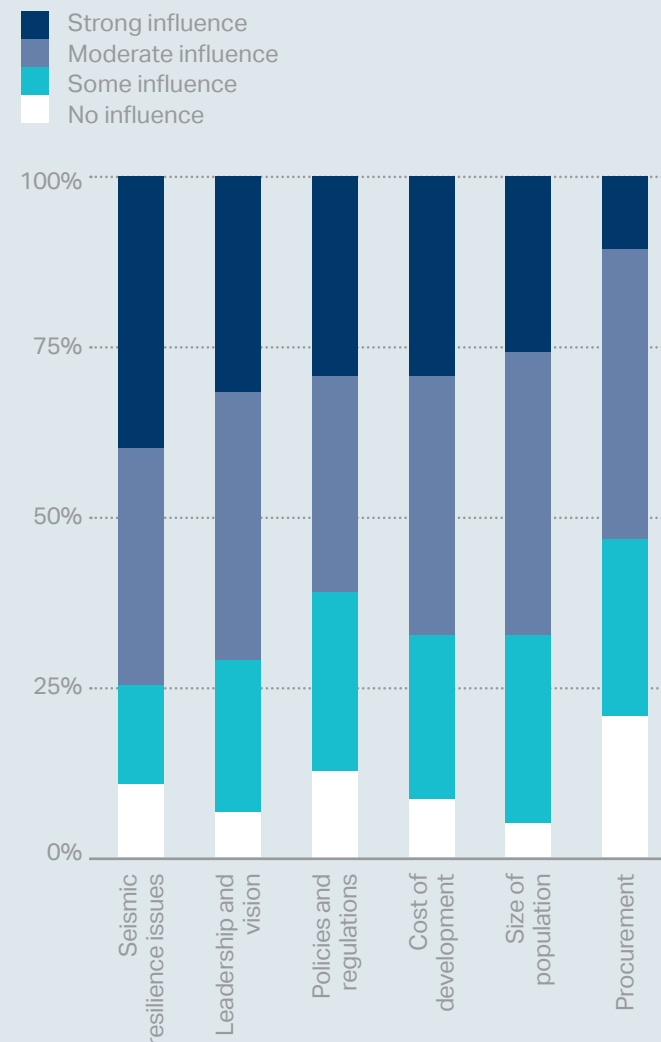
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As quality of life becomes one of the most sought after characteristics of a city, Wellington continues to be recognised for its unique and desirable set of attributes. Compared to other centres, the mix of cost of living, air quality, climate and housing prices creates an environment envied globally. The general buoyancy felt in the market is no surprise. It's imperative that we continue to capitalise on our circumstances. Part of that strategy should see us continuing to seek the best talent from off shore; this will only enhance our position.

IAN MARTIN
AREA MANAGER – WELLINGTON
AECOM



Wellington economic growth and development influences



FOCUS ON CANTERBURY

A focus on delivery

With the rebuild now in its seventh year, the region is changing gear. While 100 million dollars is still being spent each week on the rebuild, a competitive market, tight programmes of work and a change of Minister for Earthquake Recovery are all contributors to a changing environment. Resource capacity and capability are also being impacted by NCTIR – the North Canterbury Transport Infrastructure Recovery alliance. The construction alliance, similar to the model adopted for the Christchurch rebuild, is responsible for a wide area of work following the recent earthquake in North Canterbury, including the repair of State Highway One.

With rebuild momentum widely considered a priority, respondents were asked what degree of ambition Christchurch should strive for in the trade-off between quality and time. Results mirror that of the survey a year ago, with more than half of all respondents keen on aiming for a balanced approach – some improvement to the city, but a prioritising of timeliness over innovation. Nearly 40 percent of respondents want an ‘ambitious’ approach to the rebuild. For one respondent, *“taking short cuts during the rebuild would be a false economy and*

end up being paid for by future generations”. Another commented on the need for a forward-focused outlook: *“The earthquake has presented a great opportunity to really think about what is needed for the future, not simply the same as before.”*

This survey, there has been a growing recognition of the risk facing Canterbury as financial and resourcing needs from other regions gain dominance. *“Keeping up the momentum in the face of new infrastructure and construction challenges elsewhere in the country”* is likely to be a growing hurdle. The Christchurch rebuild is now believed to be 65 percent through its construction spend: horizontal infrastructure, public and commercial buildings and housing stock. But it still requires attention and expertise as it makes crucial decisions on anchor projects, ChristChurch Cathedral, the future of the residential red zone, the central business district and what other investment needs to be made to ensure the city is not just viable but is attractive on the international stage.

There is recognition that the improvement and future-proofing of infrastructure immediately post-quake will impact both consultants and contractors alike. Those that geared up for the rebuild will be looking at new opportunities locally and further abroad.

“

More than ever we must remain agile to the changing demands and priorities that regeneration of the city requires. To achieve excellence, we must draw attention to the procurement phase. By optimising our approach and aligning this with market capability, we can address the complex needs required in delivering these city-shaping projects. Procurement methodology must strive to achieve best value for the entire project, not focus on lowest capital cost.

—
CHRIS HEMPHILL
TECHNICAL DIRECTOR – PROJECT MANAGEMENT
AECOM



Rebuild competition and cost

Concerns around cost escalation in Christchurch are moderating. Cost expectations for Plant and materials are the biggest concern, with 64 percent of all respondents expecting increases over the next three years. Of note, 13 percent of all respondents expect those increases to be greater than five percent.

The number of respondents expecting price hikes in Labour costs has decreased by 10 percentage points over the last year to 53 percent. A similar pattern can be seen in both Energy and Fuel costs. Just under half of all respondents are expecting to see costs increase in these areas. The low unemployment rate in Christchurch (three percent), as compared to the national average (five percent), is likely one of the reasons more than half of all respondents are expecting price increases in the cost of Labour.

With a decrease in the volume of projects coming to market, contractors are bidding aggressively to secure a pipeline going forward. The focus for many is on securing the big projects, which may impact the viability of other players who miss out.

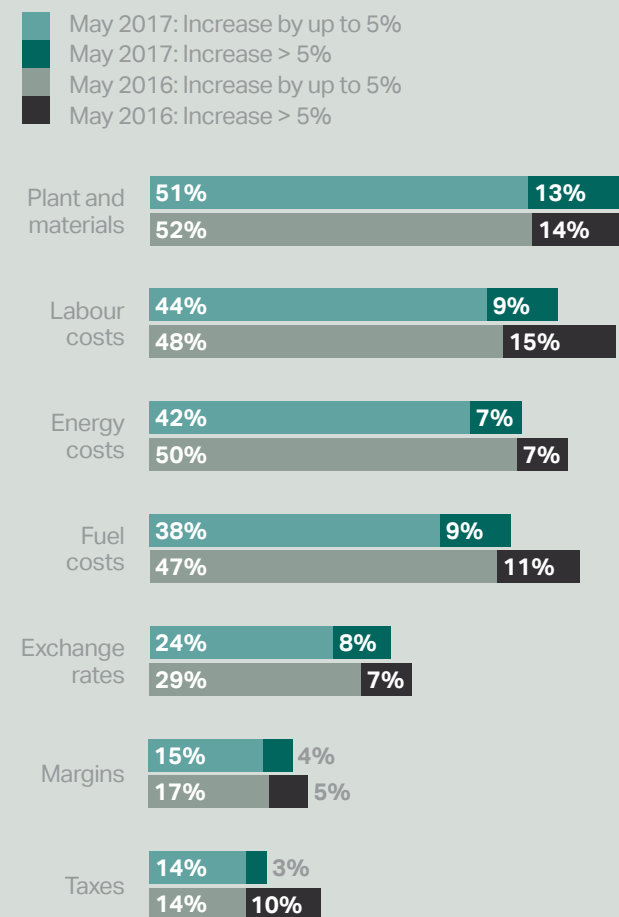
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With the demands on resourcing changing for many suppliers, transparent and timely processes will support the industry to flex capacity and capability to deliver the exciting projects yet to hit the market. The issue is compounded by the demand facing the industry from hot spots around the country. The challenge is for the industry to remain as connected as possible, at both a national and local level. Alignment between the public sector, business and central and local government is as important as ever.

SHAUN HUBBARD
AREA MANAGER — SOUTH ISLAND
AECOM



Canterbury rebuild cost pressures outlook over the next three years



Challenges and lessons for regeneration

Respondents shared several ideas about their experience in the rebuild process and lessons for regeneration.

Resourcing and planning is considered the biggest challenge facing the infrastructure and construction industry in Canterbury, with 29 percent of all respondents rating it above other potential issues. A number of respondents commented on the need to allocate infrastructure work over a period of time to avoid boom-bust cycles and minimise the effect on the city. According to one, too many big projects coming to market at once is *“not sustainable for consultants or contractors. Quality is suffering and programmes are being missed as a result of too many large scale projects being activated”*. Another respondent warned against *“spreading repair resources too thinly across the city rather than focusing on a project and completing inside tighter timeframes. This will result in less city-wide disruption”*.

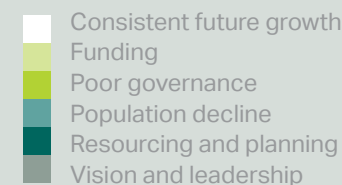
Consistent future growth and funding also rated highly as key challenges for the industry. Consistency in growth going forward is a natural concern for sustainability of a relatively small region; instability could negatively impact the area’s population and economic growth. As with the rest of the country, funding is a growing challenge for Christchurch. The survey results are a likely reflection of a changing fiscal approach. While the commercial sector was building ‘on spec’ for a period, more recently there has been detailed focus on the viability of a project well in advance of kick off.

A number of respondents felt the performance of insurance companies had impacted the city’s progress:

- *“Insurance payouts are far too slow and have affected build decisions; the centre of the old city has been left behind.”*
- *“Take these insurance companies to task over the unacceptable length of time that some claims have taken.”*
- *“Fiscal drag from insurance [has had a] significant influence on the time to rebuild.”*

Bureaucracy, leadership and the length of time the rebuild is taking continue to be recurring themes for respondents commenting on lessons learnt. Leadership needs support and consistency, according to one respondent. *“You can’t please everyone. You need to assemble the best team, back them to make decisions, and get on with it.”* For another, communication would go a long way to setting clear expectations at the beginning of the rebuild: *“It always takes longer than people expect or want. This reality should form a key part of communications from day one. The pop-up/gap filler response has been brilliant at providing a holding space.”*

Challenges and lessons for regeneration

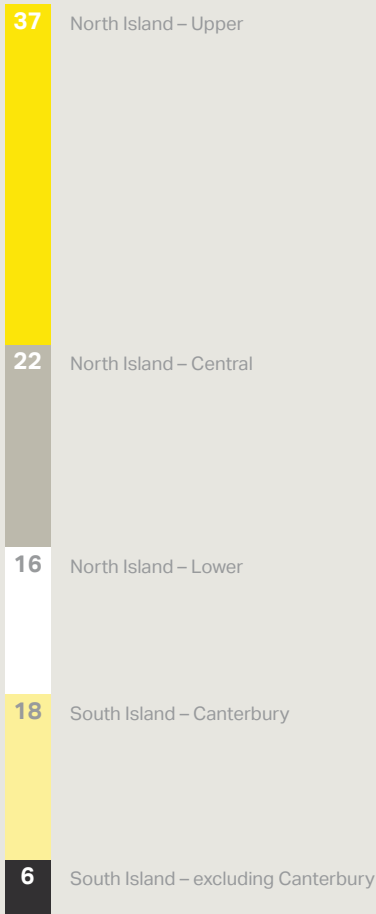


SURVEY SAMPLE — A BROAD VIEW

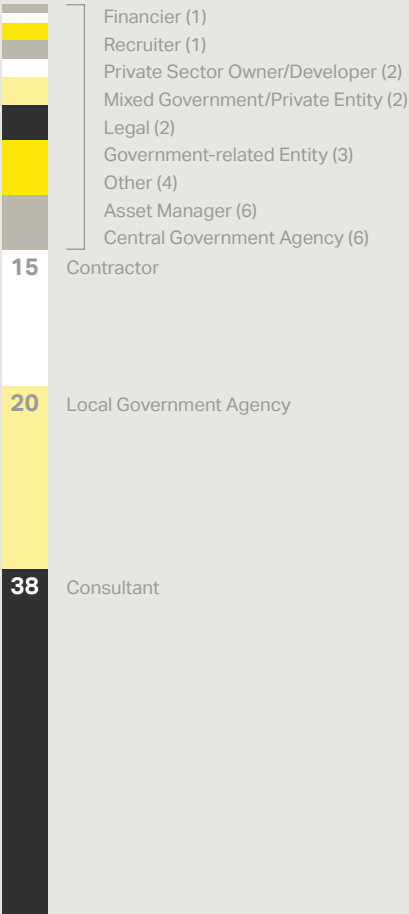
Survey respondents are invited to participate based on their role in the industry.
Leading thinkers and decision makers are selected from the buildings and infrastructure markets.

Profile of respondents

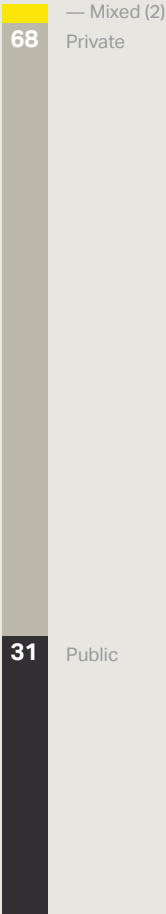
Respondents by location %



Respondents by industry role %

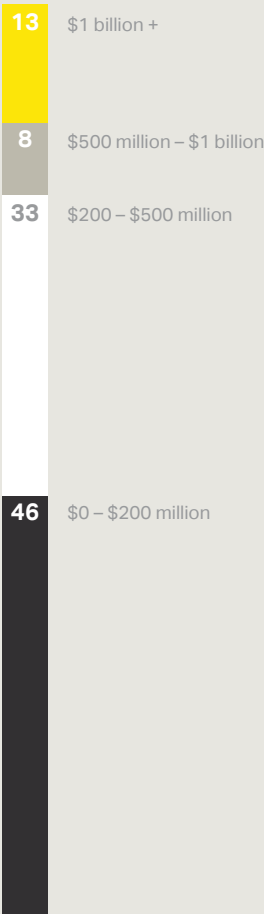


Public vs private respondents %

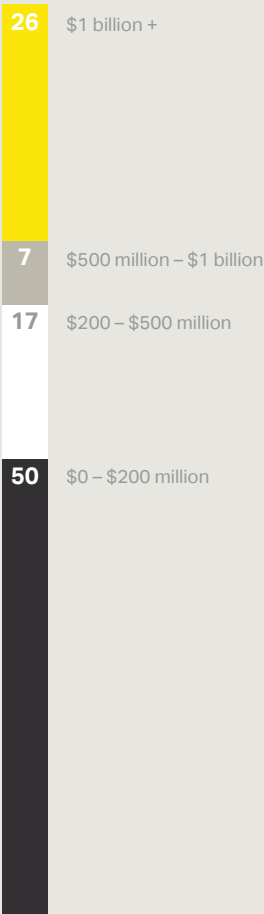


Market values

Investment market respondents by turnover %



Delivery market respondents by revenue %



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