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10 February 2015

Colin McCoy  
Head of Build Construction  
Chorus  
By Email

Dear Colin

### **Review of FPP Corridor Cost Analysis**

As requested we have reviewed the Beca report FPP Corridor Cost Analysis Full Report Nov 2014 prepared for the Commerce Commission. As you are aware, Aurecon have a strong working knowledge of infrastructure design and construction throughout New Zealand from our long history of undertaking local authority and infrastructure upgrade projects around New Zealand and overseas.

We have an awareness and understanding from the UFB installation having provided advice to Chorus on the following issues since 2012:

- Review of Auckland Transport requirements for footpath and trench reinstatement, including assessing the work completed by Chorus in the field.
- Review of the UFB Programme after Year 1.
- Assisting with cost, risk and procurement advice on the UFB project at the end of Year 1. options

We have reviewed the above Beca report and have identified a number of components of their assessment that in our opinion may not have been assessed correctly with regard to Chorus UFB project.

We refer to the section headings of the Beca report.

### **Beca defined soil categories**

Considerable emphasis has been made on the classification of the various soil types to be encountered with the trenching of the UFB project. This could lead to an expectation that there is greater certainty in these costs than actually exists. Whilst trenching rates in the various soil classifications will vary, in Aurecon's experience there are far greater variables such unmarked services that will impact on productivity rates once the method of trenching has been selected. Trenching in a built up environment, within a narrow corridor of existing services will always involve considerably more cost than in a wide open berm. It is noted that in many cases a corridor is predefined by the Local Authority regardless of any constrictions caused by existing services.

### **Appropriate Trenching Methodologies**

We note that there appears to be no acknowledgement of hard rock within an Urban environment and it seems to be only included in a rural environment. The basalt of the Auckland region is a significant issue and the impacts and delays in dealing with this rock cannot be under estimated. Certainly

contractors would require alternative rates for working in basalt trenches due to the productivity reductions.

We note that these sections tend to focus on the number of ducts that can be laid within a trench etc whereas only very small isolated lengths outside main exchanges have large numbers of ducts. Our preference would be to see a greater emphasis in accurately assessing say 1 to 8 ducts where we would expect the bulk of the UFB network to be applicable.

### **Estimating basis**

It is noted that rates were developed based on industry rates etc. for trenching. Whilst this is a good starting point it is quite easy to underestimate the complexity of finding a clear alignment within many berms and footpaths whilst also meeting the local authority's requirements. In our experience, we have regularly observed that productivity rates in the field are lower than for the installation of other trenched services as the corridor is typically very congested. This results in the UFB rates often needing to include allowances for downtime to resolve services clashes as generally there is less accuracy of service company services within the berm compared to local authority services in the carriageway. We have observed contractors needing to temporarily suspend work for half a day whilst service clashes are addressed and a solution found. Even if they can move to another trench location, there is still a delay. In a congested city environment of a large city it would not be unusual to expect a contractor to experience say half a day of disruption from unmarked services each working week. Based on say 4 hours in a 50 hour week the delays could amount to a potential productivity loss of around 8% for a team. Mitigation measures are available by pot holing in advance, but this clearly comes at additional cost too. In large cities the available working hours are restricted by the traffic controlling authority.

The Beca report confirms that rates have been built up based on what they consider are comparable scenarios where a full design has been completed and then tendered. Due to the nature of the UFB project, with variability of services from that shown on service company as built it is not typical to complete a full detailed design of the UFB alignment showing all the service clashes as would be perhaps typically be undertaken for a local authority. This means that the listed Beca rates may not always be appropriate.

The reinstatement costs vary considerably around New Zealand depending on the surface materials (grass, concrete, chip seal and asphaltic concrete for example) but also based on the minimum reinstatement requirements (including widths) of the local authorities. For example, some parts of Auckland have a Code of Practice that requires a full 2.5m of footpath to be reinstated if the alignment is central within the footpath. Those same requirements and have also detailed a full 3m width paver laid asphaltic concrete reinstatement of a road crossing. Other local authorities require the full traffic lane to be resealed where there is any trenching in the carriageway. In our opinion these requirements cannot be assessed simply by using an assumption that all reinstatement is asphaltic concrete and at standard width. Further work is necessary to accurately understand the impact of these requirements. Given the importance of these issues it is surprising that there is not further reference to them.

### **Statutory Planning and Consenting.**

The comments in this section appear to miss the complexity of the entire UFB approvals process, which by virtue of the scale of the programme requires ensuring that packages are presented for approval well in advance of the physical works and that consistent outcomes are being achieved nationwide.

In our experience it is not possible to expect that the consenting costs for Kapiti and Horowhenua could be applied in a city or large city as the requirements are far more complex and onerous. Given the scale of the UFB this cost needs to be weighted upwards to reflect the considerable lengths of USB to be installed in the cities. These figures appear unreasonably low.

### **Traffic Management**

Again the use of Horowhenua and Kapiti figures for traffic management will misrepresent the complexity of traffic management in the cities. The compliance and approval costs are now significant parts of any city work and many roads in the Auckland area have traffic management costs of in excess of [ ] per day before the major arterial routes are even considered. Based on typical productivity rates for trenching of say 60m per day this could result in costs at [ ] per m or greater. Whilst directional drilling could reduce this to say [ ] per m, it does mean that the average cost in many Auckland roads would be considerably higher than the \$5.26 per m nominated by Beca.

### **Contingencies**

The Beca report confirms that they believe that the rates are robust enough to warrant contingencies to be excluded. For such a high level assessment with access to rates and actual costs around the country we consider that contingencies should be included at this stage.

There are numerous costs that are faced on the UFB project that have not been documented by Beca and as such may not have been considered. Specific items that we are aware of that have not been mentioned by Beca include

- Arborists- this represents a significant cost when working around large and protected trees. Within Auckland millions of dollars have been spent annually on arborist fees to assess and prune trees and roots.
- Dewatering – no allowance has been made for dewatering. However in some regions of New Zealand winter trenching could well require dewatering.
- Service relocations. The Beca report assumes that a suitable corridor will exist on all occasions. History shows that many services have been installed without compliance to standard offsets and as such, over longer distances may close up on the kerb line etc. In these situations it may be necessary to install a junction box or to slightly realign the other service when trenching adjacent. All of these issues are real costs that can be faced.
- Extra over reinstatement. There appears to be no allowance for the need to replace additional areas outside of the trench proper to cover areas of unavoidable damage or make good provisions required by Local Authority Codes of Practice.

We believe that the use of a figure of 5% for regions and 10% for city locations should be adopted to cover the miscellaneous items addressed above that have not been individually costed. City miscellaneous costs will have the greater likelihood of being more complex and a greater extent of work to resolve issues. These elements are never going to be included in rates supplied by contractors.

### **Other**

Preliminary and General (P&G) costs relate to project planning and management items that are not typically incorporated within direct work rates. Onsite and off-site overheads and are often in addition any unit rates supplied by contractors. Beca do not appear to have addressed how these overheads

have been allocated into the costings. This needs to be explained as it could typically be expected to account for around [ ] of the total cost depending on the exact structure and requirements.

There is uncertainty in where the design costs sit. They need to be considered as part of the total cost of the installation if they are not included elsewhere.

Comparison of costs around New Zealand.

The Beca report includes a number of references to trenching and trenching rates in the Kapiti and Horowhenua region, unfortunately costs in the big cities vary greatly from these regional costs.

We note that in terms of total road centre line length, Horowhenua / Kapiti is approximately 20% of the Auckland length of 5260 km. It does not appear that this has been addressed by Beca with a fair weighted moderation factor. It is uncertain why so much emphasis has been placed on Horowhenua / Kapiti when this is such a small part of the total network and we would not consider it truly representative.

## Summary

The Beca report is a good starting point at assessing the costs being faced on the UFB project but has probably placed too much emphasis on the ground types and duct numbers and not enough accurate costing on assessing a standard trench and realistic reinstatement scenarios throughout New Zealand.

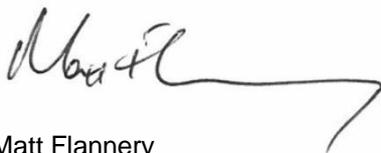
There needs to be improved recognition of the complexities and costs of undertaking the work in the cities as opposed to the regions. Given the number of metres of installation in the cities it is surprising that there are not stronger references to costs in Auckland and Wellington for example. Further work needs to be done to more accurately assess the Auckland costs. Further work also needs to be done to include allowances for:

- Miscellaneous items
- P&G costs
- Design

Further work should be done to better understand the sensitivity of the reinstatement requirements and the impact of the requirements of Local Authorities on the final costs.

We are happy to explain any points and look forward to reviewing the additional work suggested above.

Yours sincerely



Matt Flannery

Project Director

Enclosed: Aurecon brochure



**aurecon**

**a**

**Leading. Vibrant. Global.**



# Welcome to Aurecon



As one of the world's leading engineering, management and technical services consultants, Aurecon is focused on adding significant value to our clients' businesses and ensuring reliable, effective delivery of infrastructure and projects.

With a global presence, and an unrivalled breadth of technical expertise, our client-centric approach means our business is structured to support agile, rapid response to client needs and to deliver consistent, high quality outcomes.

Aurecon's values form the foundation of our commitment to our client relationships, our promise to our people, and the contribution we make to the communities in which we live and work.

We aim to set the benchmark in engineering, management and specialist technical services which benefit communities and make a significant contribution throughout the developed and developing world.

We understand success means different things to different clients and to different communities. Our business model focuses on establishing our client's definition of success and tailoring the best Aurecon team across industries, expertise and geographies to engineer that success.

This approach ensures clients receive market-leading customised solutions that deliver business advantage.

Regards,

A handwritten signature in black ink, appearing to be 'TD', written over a light grey rectangular background.

**Teddy Daka**  
Chairman  
Aurecon

- **We foster human achievement through excellence, innovation and collaboration.** Our clients know that the solutions they receive from us are innovative and in line with international best practice.
- **We celebrate diversity and respect others by acting with integrity and honesty.** This is embedded within our culture and is nurtured in all of our interactions.
- **We work to build a vibrant and brighter future for all.** We are committed to sustainable practices, solving environmental challenges and investing in the well-being of present and future generations.

# our people



“We are committed to unleashing the potential of our people through a high-performance culture that supports technical and personal development and effectively aligns it with client needs.”

**Human Capital Team, Aurecon**



**Camilla Gibbons**  
Winner of New Zealand  
Engineering Excellence  
Award.



**Mpho Ramphao**  
Winner of Consulting  
Engineers South Africa/  
Aon Engineering  
Excellence Award.



Our people enjoy a vibrant and collaborative work environment and by fostering a culture of empowerment, they are highly motivated and passionate about what they do for our clients.

We thrive on diversity and uphold a culture of respect and mutual learning. We support our highly skilled workforce with structured career development opportunities and extensive internal and external training, development and mentoring.

Our people aim to set industry standards, benefit communities and make a significant contribution wherever we operate in the developed and developing world.



**Opposite page**

The multi-award winning NMIT project in Nelson, New Zealand. A world first in seismic resistant timber design.

**Below**

The award winning Sandton City Shopping Centre expansion project in South Africa. The centrepiece of the extension is the innovative Protea Court Rooflight, which is made of lightweight EFTE film.



“Innovation is a core value at Aurecon and is integral to the way we do business.”

**Kourosch Kayvani**, Head of Innovation, Aurecon

# innovation

Innovation is a core value for Aurecon and is integral to the way we do business. We provide added value at every stage of the project cycle by finding novel solutions to our clients' most pressing challenges.

To help clients respond effectively to business opportunity and risk, our world-class teams apply expertise from more than 70 specialist service lines to create innovative and leading solutions.

## Celebrating innovation

Innovation is ingrained into our culture. With an environment that encourages and rewards those who collaborate across specialist areas and global teams of experts, our people are empowered to think beyond conventional boundaries.

We celebrate innovation across all of our markets through our global Aurecon awards programme.

This recognises excellence throughout our company in client outcomes, project delivery, innovation, collaboration, diversity and teamwork, and benefit to the community, environment and economy.

Our clients share in Aurecon's extensive thought leadership and valuable practical knowledge gained in decades of experience on projects spanning more than 80 countries worldwide.



“Aurecon’s Health & Safety culture embraces our daily interactions with clients and each other. Health & Safety is a focus of our everyday lives, not something we merely ‘comply’ with.”

**Health & Safety Team, Aurecon**

**Above**  
Horizon Power training programme, Australia.



# health & safety

We understand that fostering a robust and responsive Health & Safety culture is a critical part of our obligation to our employees, our clients and the communities in which we operate. Our strong culture of Health & Safety is underpinned by a detailed, targeted and responsive safety governance framework and management system.

This system enables us to:

- Support a safe and healthy work environment for everyone associated with Aurecon
- Provide practical tools and techniques for use in the assessment and consideration of occupational Health & Safety issues across all work we undertake
- Provide expertise and resources to implement and maintain our Health & Safety policy
- Provide Health & Safety management processes to anyone working on an Aurecon project to assist in:
  - Preventing incidents
  - Implementing hazard reduction
  - Assessing, managing, controlling and reducing risk
  - Comprehensively managing injury and rehabilitation
  - Promoting health and continual improvement in Health & Safety behaviour

# quality



“Aurecon’s Quality and Environment team goes the extra mile to give our clients peace of mind, and to support our project teams in the provision of output that is consistent, compliant and of a high standard.”

**Sonja Sendfeld,**

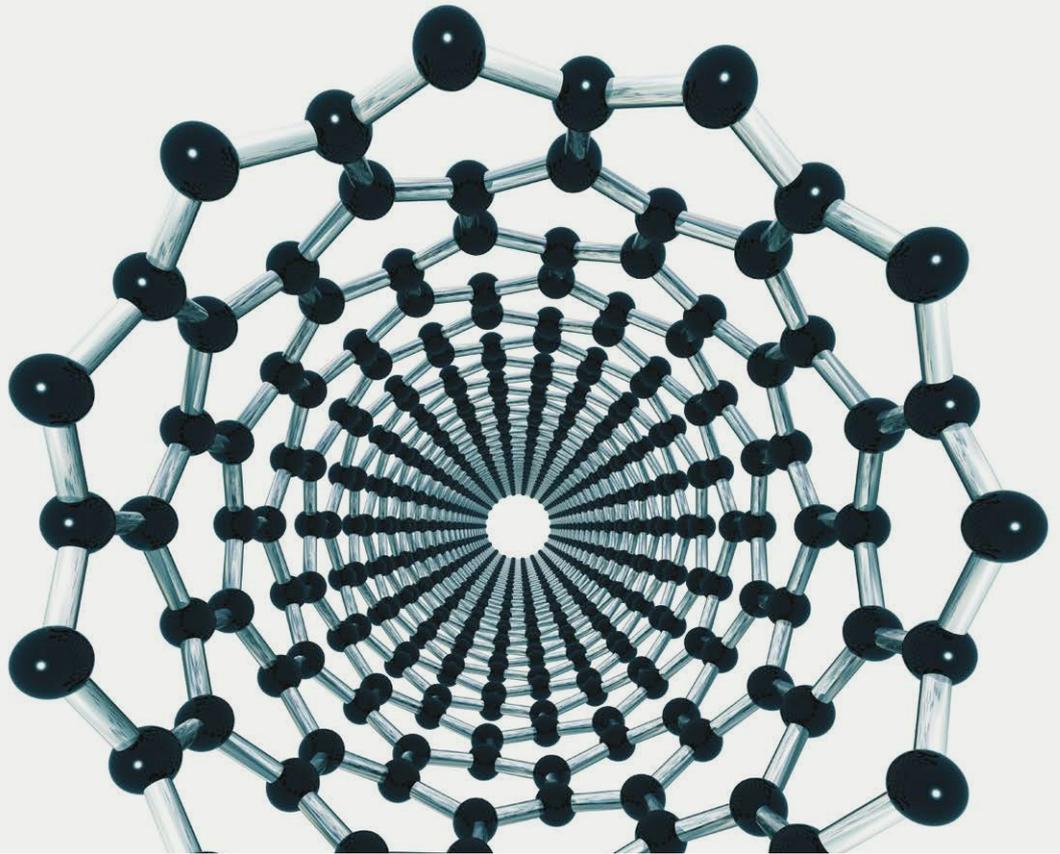
Head of Quality, Environment and Sustainability,  
Aurecon

Aurecon is governed by a comprehensive management system, which includes sub-systems for health and safety, environment, quality management and laboratory quality management.

The quality management system is applicable to all of Aurecon’s activities in the concept, feasibility and planning phases, as well as the design, construction, operation and maintenance phases of each project.

Our quality management system is ISO 9001 compliant, with certification being held in most territories and the earliest original certification dating back to 1993, underscoring the maturity of Aurecon’s approach to quality management.

In addition, our laboratory quality management systems provide for the requisite calibration and verification of test equipment, competency of testing staff and ongoing verification of test methods, giving clients confidence in the accuracy of test reports. Our laboratories are accredited to ISO/IEC 17025 by national accreditation systems.



Aurecon is committed to the principles of sustainable development – meeting the needs of the present without compromising the ability of future generations to meet their own needs.

We have embedded sustainability as an integral part of Aurecon's culture, skills and deliverables. We:

- Help our clients, partners and stakeholders meet their sustainability commitments
- Incorporate sustainability considerations into our services and project deliverables
- Continually increase our sustainability knowledge, skills and tools
- Incorporate sustainability into our corporate values
- Explore innovative ways of reducing the footprint of our operations, including carbon emissions

Responding to broader sustainability and immediate climate change challenges, we encourage innovation and support sound scientific and engineering research into enhanced energy, building, water and infrastructure solutions that meet community needs, now and into the future.

# sustainability

“Aurecon continuously seeks new ways of responding to the sustainability challenge by pioneering innovative design and technology solutions.”

**Gustav Rohde**, Chief Operating Officer, Aurecon



# building a better world for all

One of our key values is working to build a vibrant and brighter future for all.

We contribute to a better world through our socially responsible and sustainable approach to projects, and our input to people-focused infrastructure in the community.

We are also committed to investing resources to help improve quality of life for populations in the countries where we work.

Aurecon aims to set industry standards, benefit communities and make a significant contribution throughout the developed and developing world.

## **Our communities**

Our people are actively encouraged to contribute to their communities, with many of our 7 500 professionals actively involved in a wide range of Corporate Social Responsibility (CSR) initiatives.

From supporting indigenous communities, to encouraging science and technology in schools, volunteering in disaster hit areas or raising funds for disadvantaged children or the homeless, our people are highly motivated to use their expertise to give something back to the community.

## **Diversity**

As a company dedicated to providing the best solutions for every client, we know that having a diverse team is imperative. Diversity allows us to offer alternate perspectives and solutions to our clients and helps us find better ways to interact and communicate.



Aurecon has an active diversity leadership team that leads several programmes designed to promote race and gender diversity across Aurecon. Our global 'Aurecon Women. Achieving Women' group runs inclusive activities and events that promote the development of all staff with a focus on the needs of women. This group provides opportunities for networking and mentoring and advises on initiatives that are building Aurecon as an employer of choice for women.

Our Transformation and Diversity Forum, which leads our PRO Aurecon African based diversity and CSR initiatives, drives corporate citizenship and race diversity programmes including our Broad-Based Black Economic Empowerment (BBBEE) initiatives in South Africa. We are also developing indigenous employment programmes throughout our global network.

### **Broad-Based Black Economic Empowerment**

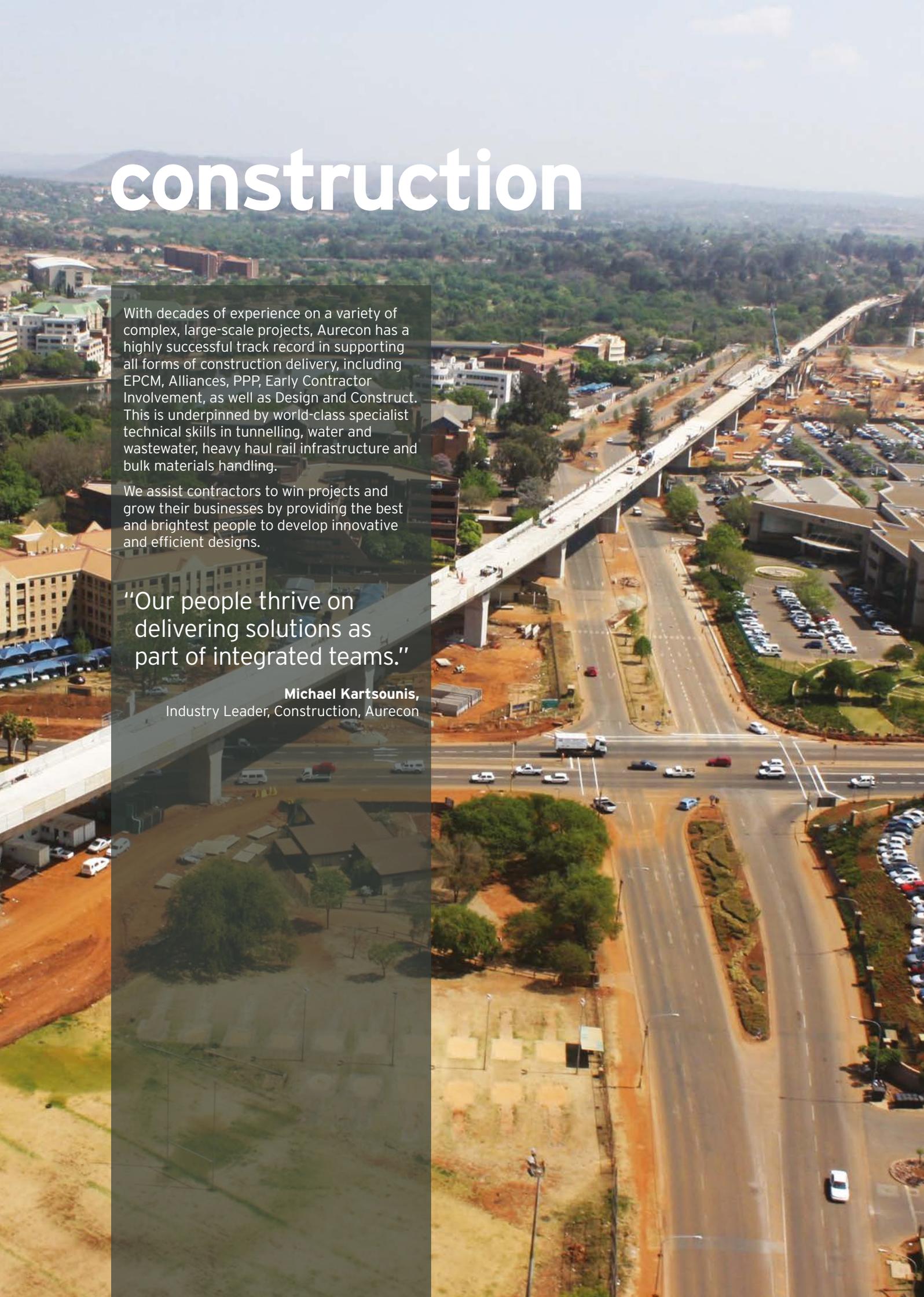
Aurecon South Africa is committed to the implementation of BBBEE. A South African Government initiative, BBBEE aims to facilitate the involvement and participation of all historically disadvantaged individuals, broadening the country's economic base as well as stimulating economic growth and employment.

Aurecon has been verified as a Level 2 Contributor to BBBEE. With a procurement recognition level of 125%, clients may claim any Aurecon fees incurred as BBBEE spend at the same level towards their own BBBEE certification. Aurecon has been assessed as a Value Adding Vendor, which means that the fees claimed as BBBEE spend can further be enhanced by a factor of 1.25.



Our people are highly motivated to enhance the world around them, both in their daily work and through voluntary community activities.

# construction



With decades of experience on a variety of complex, large-scale projects, Aurecon has a highly successful track record in supporting all forms of construction delivery, including EPCM, Alliances, PPP, Early Contractor Involvement, as well as Design and Construct. This is underpinned by world-class specialist technical skills in tunnelling, water and wastewater, heavy haul rail infrastructure and bulk materials handling.

We assist contractors to win projects and grow their businesses by providing the best and brightest people to develop innovative and efficient designs.

**"Our people thrive on delivering solutions as part of integrated teams."**

**Michael Kartsounis,**  
Industry Leader, Construction, Aurecon

# data and telecommunications



Increasing social and political pressures are being placed on governments and network operators to provide infrastructure that can deliver large quantities of data and telecommunications more quickly and economically.

Aurecon works with key public, private and global clients to deliver major data and telecommunications infrastructure projects together with business solutions to meet this challenge.

Our technical experts provide smart building services solutions for data centres by utilising our strong industry connections and access to resources across geographies.

Aurecon's 'whole of project' approach provides our clients with an integrated service to deliver network deployment, infrastructure and buildings for data and telecommunications services.

**"Aurecon's clients value our combination of innovation and reliability in delivering smarter technology solutions."**

**Stephen Negus**, Industry Leader,  
Data & Telecommunications, Aurecon

**Above**  
Delivering network upgrades with Chorus, New Zealand.

**Opposite page**  
Gautrain Rapid Rail Link in Centurion, South Africa.



# defence

Aurecon has a long history of providing technical and advisory services to Defence client agencies and the wider industry. We have an impressive track record in the planning, management and delivery of complex defence projects, and we have membership on a large number of defence supplier panels.

As a trusted partner, we have designed and executed many defence infrastructure projects, including airports, training facilities, navy bases and ports, as well as army barracks and logistics facilities.

We have provided expert advice to Defence agencies and the industry on a range of acquisition projects.



# energy

We draw on the talents of our global team to provide clients with access to expertise in all areas of the energy industry, including power generation, industrial and process engineering, together with energy advisory and management consulting services. We also undertake financial modelling to support policy and investment in the industry.

Our specialist oil and gas team delivers high-end engineering solutions to our clients' industry specific challenges.

Aurecon provides comprehensive consultancy services over the entire life cycle of power generation, transmission and distribution projects, from feasibility studies through to asset management.

We offer innovative services for renewable energies, and are leaders in the wind technology industry.

“Many challenges were expected with such an upgrade project. The Control System Upgrade has been completed on-time and on-budget and Aurecon has contributed positively to this excellent result.”

**Mike Campbell,**  
Engineering Manager, Huntly Power Station

**Opposite page**

The Multi Role Tankers Transports (MRTT) facility at RAAF Amberley, Australia.

**Below**

The first base isolated DC converter stations in the world, NZ Inter Island High Voltage Direct Current HVDC POLE 3 Converter Station project, Benmore, New Zealand.





# government

Aurecon supports local, regional and national governments in providing a comprehensive range of services, including optimising the available resources towards sound infrastructure investment decisions, positioning assets to meet long-term service delivery priorities and accommodating long-term growth.

We have extensive experience in the provision of planning and advisory services for health, aged care and education facilities.

Our technical competencies span the entire infrastructure life cycle – from planning, design and construction to operations and maintenance of services including energy, housing, roads, water and wastewater.

“Aurecon supports government clients by providing an integrated service, which extends beyond engineering solutions.”

**Danie Wium**, Industry Leader, Government, Aurecon

**Above**  
Community  
Residential Unit  
Project Refurbishment  
Programme,  
South Africa.

**Opposite page**  
Maguga Dam on  
the Komati River,  
Swaziland.



# international development assistance

At Aurecon we believe that sustainable solutions are a positive step towards alleviating poverty. These solutions enable developing countries to create and develop their capacity to overcome this challenge.

Aurecon has partnered with many major donors, including the World Bank, European Union, African Development Bank, Asian Development Bank, USAID and AusAID, as well as bilateral agencies. Our work includes services such as the provision of roads or clean water, as well as social projects in health and education.

As a leader in the industry, Aurecon has the extensive knowledge, experience and expertise to provide innovative and effective implementation of projects. Clients trust us to effect real change in the countries and communities where we work.

Our philosophy is to provide sustainable solutions, which are needed to overcome the challenges facing developing countries.



# manufacturing

Aurecon has the expertise and global resources to provide clients with a broad spectrum of safe, environmentally sustainable and cost-effective solutions that span the entire life cycle of manufacturing projects. This extends from concept development and evaluation of an opportunity, through to the creation of new assets, and their sustainment and improvement.

We understand the need for bottom line focused engineering solutions that, in addition to enabling cost efficiencies, will ensure long-term durability and ease of execution.

We offer specialist solutions relating to:

- Asset management
- Commissioning and start-up
- Environmental management planning
- Engineering, procurement and construction management
- Planning and approvals
- Process design and analysis
- Societal licence to operate
- Supply chain logistics
- Water and waste treatment

# property



“We deliver elegant design outcomes that offer immensely practical benefits for building users, owners and tenants alike.”

**Ermis Marques**, Industry Leader, Property, Aurecon

Whether dealing with difficult site conditions, overcoming the inherent challenges of tall buildings or the complexities of stadia design, Aurecon has built a reputation for lateral thinking that creates elegant design outcomes. Our property team is highly skilled in data centres, defence facilities, hospitals, stadia, retail and office parks, airport terminals, golf and leisure estates and education facilities.

Our property services span commercial office buildings, justice, land development, light industrial, residential, retail and sports and leisure distribution.

**Above**  
The Sail at Marina Bay,  
Singapore.

**Opposite page**  
Project Proton,  
Kimberley-Clark,  
Australia.

# resources



Long term global demand for commodities, driven by emerging economies, will continue to apply pressure on the resources industry to mine, process and export these commodities, at a competitive cost.

We are focused on assisting our clients through tailoring solutions that increase direct operating hours – improving reliability and reducing maintenance through operational design solutions is key.

Aurecon has delivered small start-up facilities through to major engineering, procurement and construction management (EPCM) projects, including bulk materials handling projects, mine, rail, seaboard import and export terminals, and associated port and marine facilities.

Utilising in-house multidisciplinary skills, Aurecon delivers a range of engineering services across the entire project life cycle, including:

- Engineering, procurement and construction management
- Scoping, conceptual, pre-feasibility and feasibility studies
- Health, safety and environmental management
- Owner's Engineer
- Process automation, controls and instrumentation
- Supply chain logistics
- Mine surface infrastructure design
- Geotechnical services
- Structural engineering
- Civil engineering for bulk earthworks and services; roads and rail and ports
- Bulk material handling and transportation from pit to port

"...the exceptional commitment of the Aurecon design teams, together with the contracting strategy adopted, ensured that the X50 expansion was completed to a high quality, within budget and on schedule."

**Brad Fish**, Chief Executive Officer,  
North Queensland Bulk Ports

“As global transport markets evolve, challenges arise which require non-traditional approaches and innovative solutions.”

**David Radcliffe**, Industry Leader, Transport, Aurecon



# transport

Our transport industry team combines expertise across engineering, financial modelling and legal systems to support excellence in the planning, design, construction, management and delivery of transportation systems, including roads and highways, rail, tunnels, bridges and associated structures, airports and ports.

As governments worldwide increasingly focus on sustainable and smart transport systems, we have developed a complete capability in traffic engineering and transport planning. We work collaboratively with our clients throughout the entire asset life cycle, from pre-feasibility and business case preparation through to the operation and maintenance phases.

Our transport services span:

- Airports
- Freight, logistics and infrastructure
- Rural transport
- Urban transport

**Above**  
Incrementally launched  
bridge, South Africa.

**Opposite page**  
Abbot Point Coal  
Terminal, Australia.



# water

Water poses a critical challenge in the coming decades as businesses and governments worldwide search for sustainable solutions to manage this vital resource. Aurecon's team of leading water specialists work with clients across every facet of the water cycle to design and deliver the most cost-effective and sustainable infrastructure solutions, ranging from network modelling and sewer tunnelling to treatment plant design and operations management.

Our team offers world-class technical skills in water resources, water supply, treatment and distribution, wastewater collection and treatment, desalination and water recycling. We can also offer significant expertise in the legal, environmental, planning and community consultation issues around water projects.

"Aurecon's service on site has been altogether excellent."

**Johann Wessels**, Deputy Director,  
Waste Water Collection, City of Tshwane





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**About Aurecon**

Aurecon provides engineering, management and specialist technical services for public and private sector clients globally. Aurecon, with an office network extending across 27 countries, has been involved in projects in over 80 countries across Africa, the Americas, Asia Pacific and the Middle East and employs around 7 500 people throughout 12 industry groups. We seek to foster human achievement in all aspects of our work.

**Aurecon offices are located in:**

Angola, Australia, Botswana, Chile, China, Ethiopia, Ghana, Hong Kong, Indonesia, Lesotho, Libya, Malawi, Mozambique, Namibia, New Zealand, Nigeria, Philippines, Qatar, Singapore, South Africa, Swaziland, Tanzania, Thailand, Uganda, United Arab Emirates, Vietnam, Zimbabwe.

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