

Charting ARTNL's assets
How to save \$200,000 a day
Keeping customers happy
and more...

■ INFRASTRUCTURE

Going with the flow

The jacking of 'Beca's pipe' for Singapore's Link Sewer project began successfully in February. Despite Singapore's tricky alluvial ground conditions, specialist pipe-jacking machinery was moved below ground without a hitch to begin 'pushing' the pipeline into place. The machinery balances earth pressures at the head of the machine to prevent the collapse of the cutting face.

Continued inside...

In brief

Beca on the web! Beca's full range of services is now at your fingertips. Click on www.beca.co.nz for immediate access to news and project information about Beca's global activities – all on a single, searchable and easy to navigate site. Want to know how the company tackled a particular project in a specific area of industry, or the latest news from Beca's world? You'll find it all at the click of a button.

The Risk and Cost Management team has been working with Transit New Zealand on its SM014 Cost Estimation

manual. This is designed to enhance skill levels within the roading industry and aims to achieve greater cost estimate accuracy so that Transit's funds will be invested in the most appropriate projects.

Council Guidance – The Risk and Cost Management team has also been commissioned by Rodney District Council (RDC) to investigate, develop and manage the risk profile of its Hibiscus Coast Sewerage Strategy. Beca will guide the Council throughout the decision-making process, enabling it to make effective knowledge-based decisions to maximise project success.



A happy result: (from left to right) Beca's Tom Clarke, Paul Wells-Green and ARTNL Harbour Berths General Manager, Kevin Brown, at Auckland's Ferry Building.

Charting ARTNL's assets

ARTNL – the Auckland Regional Transport Network Ltd – is forging ahead towards its goal of making a smooth flowing, integrated public transport system a reality for Auckland.

ARTNL is an initiative by six of the Auckland region's councils to own, lease, develop and manage rail corridors, ferry terminals and the new Britomart station. Beca has been working with ARTNL's Harbour Berths business unit, to create its initial asset management plan and first detailed asset register for ferry wharves.

Paul Wells-Green and Tom Clarke from Beca Valuations have been involved in assessing the condition and performance of the relevant wharves and ferry terminals, and had just over a week to get the first version of the plan in place. Their previous marine and coastal experience

proved invaluable – Paul had actually designed Orakei Wharf (one of the structures being assessed) in the late 1980s.

The asset management plan sets out the service standard expected of the assets and forecasts the long-term costs entailed in meeting this standard. Plans are living documents, and must be updated regularly to achieve maximum value. ARTNL Harbour Berths, under the guidance of its General Manager, Kevin Brown, has significantly updated its plan based on feedback from its shareholder representative group.

Comments Kevin, "A realistic asset management plan is essential for our organisation's business units. Ultimately our long-term costs of sustaining assets impact on annual revenues, which are reflected in passenger fares. The plan therefore needs to be robust and professional. The Beca team understands these key principles and has the resources and experience to deliver such a plan."



A smooth process: the finishing touches are made to parts of the Link Sewer tunnel before it's moved below ground.

INFRASTRUCTURE

Going with the flow

– Continued from cover

The Link Sewer project is part of the new Deep Tunnel Sewerage System (DTSS) being constructed far below Singapore's streets. Beca is responsible for the design, tender and construction supervision of the Tanah Merah Link Sewer tunnel – one of twelve that make up the System. These will intercept flows from outlying areas of the existing sewerage reticulation system and transport them by gravity – rather than by pumping mains – to the central DTSS and on to the US\$1.1 billion Changi Wastewater Treatment Plant currently under construction. At seven kilometers long, and up to three metres in

diameter, the Tanah Merah pipe is one of the largest of the Link Sewer projects and reaches depths of up to 40 metres to produce an efficient, gravity driven flow.

During construction (which began last July) Beca engineers have worked closely with the contractors involved in building other sewers. The Tanah Merah pipe interfaces with a DTSS diversion chamber where the work of a number of teams meets. The project has also seen much close cooperation, resource and knowledge sharing between Beca's Singapore, New Zealand and other international offices to produce the optimum solution.

For more information, see the Link Sewer feature project on the Water, Wastes & Environment section of www.beca.co.nz

Saving cash for an on-site crush

Australia's IFBS engineers recently extended their comprehensive winery engineering expertise into process automation – challenging the status quo with successful results.*

IFBS has been selected by the Wingara Wine Group to provide all project design and management services, including automation design, as part of a project to double the capacity of the Deakin Estate winery in northwest Victoria to allow for a yearly 20,000 tonne crush.

As part of its scope of services, IFBS was responsible for the design and implementation of the software control system. Typically, one contractor is engaged to provide all electrical and automation services including the supply of all automation hardware. The approach IFBS took was to separate the procurement of automation hardware from the electrical contractor, enabling IFBS to negotiate directly with the hardware suppliers thereby lowering the capital costs. By managing that supply, the savings

generated funded the software development outright. As a result, IFBS was awarded the software development.

This approach suits any process control or automation project, and is currently being applied to projects in the water treatment industry with similar success.

*International Food and Beverage Services Pty Ltd, a wholly owned subsidiary of Beca Carter Hollings & Ferner Ltd.



A growth business: IFBS has developed its winery expertise with fruitful results.

Bright lights, big city: Beca has been auditing substation construction quality in Melbourne's CBD.



Substation quality control

As the Australian power industry consolidates within an increasingly competitive market, many distribution companies are outsourcing their engineering capability.

Beca has been working for Melbourne's CBD distributor, CitiPower, to audit many of the substations being built in its area, and bring their construction quality in line with the client's benchmark. Beca assessed each new substation and prioritised those needing the most urgent work. Engineers logged the issues, agreed with the client the

best way forward, and made recommendations to ensure building contractors acted upon suggested changes.

Priority was given to the basement substations being constructed as they were found to be subject to different standards of water protection. Beca was quick to resolve this issue by suggesting a secondary line of resistance. However, prevention is always the best cure, and Beca has worked closely with CitiPower to develop a longer-term solution, which involves engineers rewriting the substation design specs and producing standard drawings. CitiPower can now supply these drawings to developers and contractors to improve, standardise and control the construction quality of new substations.

APPOINTMENTS

The fellowship of the win

Gavin Cormack, chairman of the Beca group, is one of just four of the engineering industry's leading lights honoured with IPENZ Distinguished Fellow status this year.*

Promotion to this level of membership within the respected professional organisation is only given to those who are considered to have substantially contributed to the development of the engineering profession and its practices, or to IPENZ itself.

Roly Frost, general manager of Beca's Civil section, has been made Vice President of IPENZ for 2003/4. His appointment reflects his experience in senior management positions in the engineering profession – and roles in the

wider community – and his appreciation of the role of IPENZ in promoting the profession. His appointment recognises too Beca's involvement in nurturing industry expertise within the company, and the contribution it has made to engineering's development and profile.

Lee Chuan Seng, managing director of Beca Carter Hollings and Ferner (SE Asia) Pte Ltd, has been appointed to the board of the Building and Construction Authority in Singapore. The BCA is a statutory body under the auspices of the Ministry of National Development, and aims to develop and regulate Singapore's building and construction industry.

**Institution of Professional Engineers New Zealand*

Top knotch: (from left to right) Gavin Cormack, Roly Frost and Lee Chuan Seng.



BUILDINGS

Community care

It's not often that Beca gets to work alongside the armed forces, but a recent charity project involving the Christchurch team saw consultants working on site with the New Zealand Army.

Beca provided design and construction monitoring of the mechanical and plumbing services at the newly opened South Island Ronald McDonald House in Christchurch, which provides accommodation for parents and siblings of seriously ill children being treated at the nearby Christchurch Hospital.

Last year, over 6,400 children were admitted to Christchurch Hospital from all around the South Island. The three-storey, 15 bedroom House, on which construction began in April 2002, aims to be a 'home away from home' for the families of such children during this often highly stressful time.

The Christchurch Beca team members are no strangers to healthcare-related projects in the 'Garden City'. They're currently involved in the construction phase of the new NZ\$60 million Christchurch Women's Hospital and have worked on the Princess Margaret Hospital, Sunnyside Hospital and the Foundation for the Blind building.

The project, which saw Beca working with colleagues, Wilkie & Bruce Architects, required well-coordinated management as it was funded by a number of different parties, all requiring involvement. A number of physical elements of the building were donated, such as whiteware, some of which had to be incorporated late into the design process. Then there was the construction monitoring, during which army personnel were working

alongside building contractors, Ronald McDonald House staff and Beca consultants!

Nick Meeten, Beca's senior mechanical engineer on the project, says, "The Ronald McDonald House project was unusual in the diverse number of professions involved, and the dedication and range of skills that were given so wholeheartedly. Its success has given us all great personal satisfaction."

"We were quite overwhelmed by the generosity of everyone involved, including Beca," says Nickie Barlow, House Manager at the Ronald McDonald House. "Everyone went that extra distance, knowing the significance of the end product."

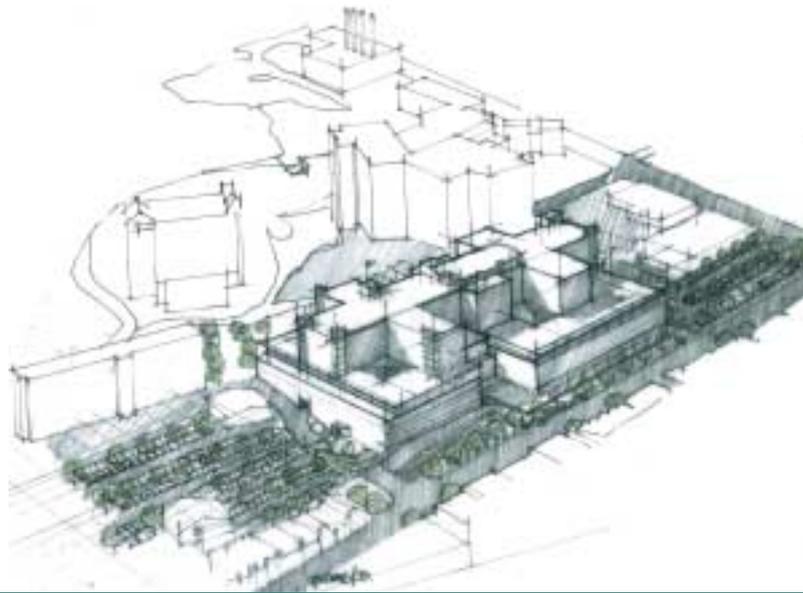
Pleased to help: Beca's Nick Meeten and Nickie Barlow, manager of the Ronald McDonald House, outside the new 'home away from home' in Christchurch.



Hospital specialist

Beca's expertise in servicing the healthcare industry goes from strength to strength, with the recent win of the building services engineering for the NZ\$300 million redevelopment of the Wellington and Kenepuru hospitals. Beca is also contributing to the project's civil and structural engineering as sub-consultants to Dunning Thornton Consultants Ltd. Beca's Wellington team will lead the design for mechanical, electrical, electronic, fire protection and hydraulic systems with the emphasis on robustness, cost effectiveness, energy efficiency and ecologically sustainable design. Beca has previously acted as services consultant for a number of projects at the Wellington Hospital, including its new Emergency Department.

Taking shape: an artist's impression of the new buildings.



Working your SCADA harder

Is your company getting the most from its SCADA system? Surprisingly few organisations are achieving the effectiveness and efficiency benefits from what should be an easy to use tool with the ability to change the way a company does business.

One of the main challenges of a SCADA (Supervisory Control and Data Acquisition) system is extracting and analysing the operational performance data it provides; and Beca has recently completed a review of Coliban Water's own system to identify issues and formulate a strategy to help the company maximise its benefits from the software investment.

Coliban Water provides 130,000 customers with water and wastewater services over an area of 16,500 km² of central and northern Victoria, and has nearly 230 separate data collection outstations monitoring various installations and sending data to a central hub in Bendigo. One of the major aims of Beca's review has been to increase the availability and value of the SCADA-generated data by integrating it with Coliban's business management systems.

Other SCADA-related projects undertaken by Beca include assessing client requirements and designing and implementing SCADA solutions using a variety of software and hardware platforms.

Data maximisation: (from left to right) Beca's Brett Rogers, Neil Burns, Executive Manager of Operations for Coliban Water, and Paul Collier from Beca.



PT Inco

PT International Nickel Indonesia (PT Inco), a subsidiary company of Canada's International Nickel (INCO), is a top producer of nickel in matte – producing approximately 60,000 tonnes a year from its mining operation in South Sulawesi, Indonesia. Gil Samoila (below, right) is PT Inco's project manager recently involved in the rebuild of the No.3 electric furnace at the site (see story below).

Q. How is your role changing, and how do you approach that change?

The nickel market fluctuates, so to maximise our profitability INCO must take a dynamic approach to seek new ore opportunities and develop new processing technologies. Managing a large-scale capital project is a challenge in itself, but as my next assignment could be almost anywhere in the world, a lack of familiarity with the local 'set up' could be an issue. However, my management experience, and the ability to 'tap' into that of local colleagues, helps me to get up to speed quickly

with the contractor, procurement and transportation capabilities.

Q. What are the main challenges in managing INCO projects in Indonesia?

Along with creating procurement challenges, PT Inco's geographic isolation means that large capital initiatives, including shutdowns, require teamwork, dedication and hard work on a major scale. The right project team can mean the difference between success and failure – particularly when we're under pressure to minimise production 'down time'. I build the team, encourage cooperation and develop a good communication plan – vital when staff are of different nationalities.

Q. How effective is a client/engineer/contractor team approach compared to management through 'arms length' contracting?

'Relationship' contracting, involving a team of top quality individuals, can deliver optimum commercial benefits to everyone involved. But fundamental to any contract is that the project scope, deliverables and risks are understood by all parties.



A cut above: (clockwise from left) cutting the furnace hearth; Gil Samoila, Project Manager for PT Inco on the recent rebuild; assembling the suspended working platform, used in the construction of the furnace's upper shell.

How to save \$200,000 a day

Despite an earlier-than-planned shutdown start, security concerns brought about by the Bali bombing, and the evolving labour relations situation within Indonesia, Beca has successfully completed the No.3 electric furnace rebuild project, with the powering up of the 65 MW furnace at PT International Nickel Indonesia (PT Inco) on the island of Sulawesi.

Beca and Beca Simons* staff provided project management, engineering, procurement and construction management services on the demolition and rebuild job, which was completed under budget and – at 115 days –

well within the target schedule. In fact, each day saved by the 25-strong management team, 35 construction staff and 1200 local supervisors and tradesmen, was worth over US\$200,000 to the client in increased nickel production.

Beca's electrical and controls engineers played a major role in helping to get the power on to the furnace so quickly. As well as a major control system technology upgrade, they replaced protection systems and carried out extensive field-testing across the systems – all within a very tight timeframe.

For more information on Beca's melter rebuild capability see the Heavy Industrial features on www.beca.co.nz

* Beca Simons is a joint venture between Beca and Amec.

Taking to the air

There's increasing talk about the effects of vehicle emissions and New Zealand's ratification of the Kyoto agreement. It seems air emissions and air quality are the words on everyone's lips.

That was certainly the case in late February when the Christchurch office hosted a client gathering to showcase Beca's air quality specialism within the wider scope of environmental management services. That expertise has been advanced in recent months with the appointment of Prue Harwood and Janet Petersen to complete a nationwide team more than able to support the strategic and practical needs of clients in this area.

Staff took the opportunity at the function to inform clients of Beca's extensive air quality capability, including air discharge assessments, emission monitoring, through to the team's policy planning, consultation and resource consent services.



Talking heads: the recent air quality client function in Christchurch.

National support for New Zealand Fire Service

If the changing dynamics within industry and local government are increasingly leaving you fighting figurative fires, Beca's national network of regional offices can assist in enabling organisations to achieve consistency in operations.

The New Zealand Fire Service (a long time client of multidisciplinary Beca services) is now receiving more longer-term, comprehensive services – rather than just one-off projects – from Beca Planning teams from Dunedin to Auckland, and all stops in between.

Planners provide a nationwide resource management monitoring service that involves ongoing liaison with local representatives of the NZFS. Beca's role ranges from advising on the implications of proposed district plan changes and variations, to informing the client of resource consent applications and Resource Management Act (RMA) related initiatives – and acting as its representative at hearings or negotiations.

"Taking a strategic approach to the RMA has been a major step forward in the management of our property portfolio," says Dave Povey, national property manager of NZFS. "A central planning database gives us consistency because we can reference decisions by other councils in similar planning situations. And having access to high level, quick turn around planning opinion is particularly useful when evaluating potential sites."

Professional tactics: Beca is providing nationwide services to ease planning-related issues faced by the NZFS.



Off-gas on target as fuel source

Strong competition in the petrochemical industry means that companies are constantly on the hunt for solutions to reduce fuel costs and environmental discharges, and increase plant efficiency.

Ballance Agri-Nutrients Ltd, though New Zealand's market leader in the fertiliser industry, is no exception. A recent project to lift performance of its Kapuni site has created a unique design solution.

At its Taranaki fertiliser plant, gas and liquid streams of ammonia and urea are handled at very high pressures and temperatures – involving chemicals and gases with the potential to shut down the entire plant if anything goes wrong with a process. Beca's Industrial engineers worked closely with the client to evolve an advanced design that involved feeding the continuous off-gas stream from the urea process back to the ammonia plant as a fuel source to new burners in the reformer. The move is a first in this type of plant – and effectively solves fuel cost, discharge, and efficiency issues in a single process.

"This project demanded a combined approach from process, mechanical, structural and instrument engineers in the New Plymouth office who provided sustained input

from conceptual reviews through to installation," said Andrew Woodger, Beca's job manager on the project.

Taranaki giant: plant efficiency at the Kapuni site was boosted by Beca's advanced design.



Filling the transmission gap

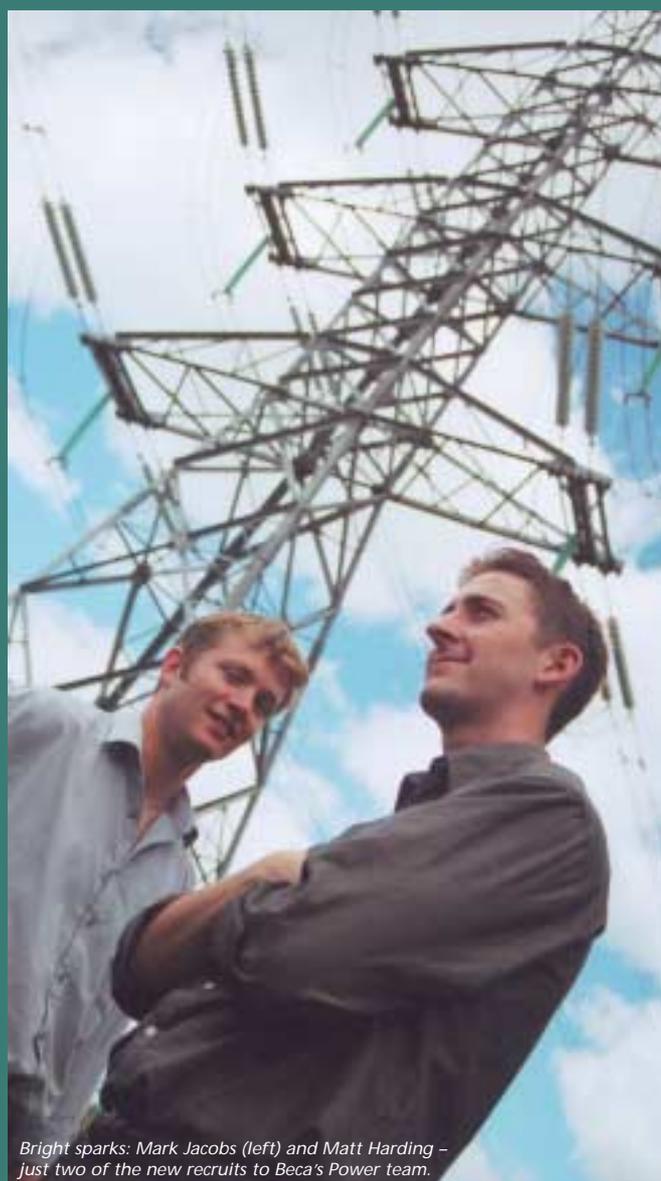
Environmental changes, both regulatory and climatic, are placing new pressures on generation – making it hard to generate electricity at the right place, at the right time.

To meet this challenge, power companies across the globe are increasingly looking to gain more from their transmission system, and New Zealand is no exception. Beca Power is working with Transpower NZ Ltd to help access more transfer capacity and flexibility from its existing assets to meet New Zealand's projected rise in demand.

Transpower is undertaking an aerial laser survey of its entire transmission line system: a new technique that provides a 3-D scan of each line, permitting the analysis of its maximum design capacity. Beca has undertaken a peer review of the technology and given the project the thumbs up. Beca is now involved in the detailed analysis, designing solutions to get those lines working to full capacity.

As a result of such major projects, over the past 18 months Beca Power has been able to fast track the development of its transmission line team, with focused recruitment of young engineers specialising in transmission line work, supported by more seasoned specialists. Beca is committed to the creation and development of its engineering expertise and its sustainability – a drive that has led to the development of a successful reciprocal graduate training programme between Beca and its clients.

The consultancy now possesses a capability to design transmission lines of 330kV and beyond, and is growing its projects in New Zealand, Australia and Indonesia.



Bright sparks: Mark Jacobs (left) and Matt Harding – just two of the new recruits to Beca's Power team.

TECHNOLOGY

PedFlo – a powerful tool

'Smart' pedestrian flow simulation software designed by Beca Applied Technologies (BAT) could become a staple part of international buildings design process.

The PedFlo software models how individuals react according to their surroundings and crowding conditions, as pedestrians flow through public areas of buildings, such as transport terminals. The software tests facility capacity, optimum door and corridor widths and lift and escalator requirements. In addition, an application within the software tests emergency evacuation and the implementation of new security processes.

PedFlo provides objective analysis in an area of design that is often ruled by subjective judgement. When it was recently used to model the evacuation of auditoria in the Centre for Culture and Communication at the Republic Polytechnic in Singapore, PedFlo provided a visual demonstration that reinforced the architect's design decisions. With 3-D animation and individual pedestrian interaction, PedFlo offers a new level of realism in contrast to other models and can be specifically calibrated to reflect local behaviour, walking speed and crowd composition and densities.

"PedFlo is a cost effective, risk minimisation option," says

BAT simulation expert, Tony Pidgeon. "The model helps define exactly what the design needs to include, and because only the design drawings are required, we can work remotely from Auckland for internationally-based clients. PedFlo has already been used for the new Britomart rail transport interchange in Auckland, and it is attracting strong interest in Asia, where high population densities and innovative building layouts are the norm."

An exact science: PedFlo takes into account walking speeds and crowd composition to model pedestrian flows.



PROMOTIONS

Sharing the rewards

Beca's contribution to landmark projects is often recognised by national and international engineering bodies in the form of awards. But what's important too is acknowledging the individual contributions made by men and women across the Beca group.

Earlier in April, 39 Beca employees from across the company's many disciplines and Australasian offices were invited to become shareholders and senior shareholders to formally recognise their outstanding commitment and

dedication to the company – as well as the expertise they possess, not just within Beca, but across the entire industry.

Commenting on the appointments, Richard Aitken, chief executive of the Beca group, says, "The company's employee/locally owned status reflects the importance we place on providing our clients with independent services and unbiased advice."

The names of the new shareholder and senior shareholders are below. For their biographies and photographs please visit the news section of www.beca.co.nz

Gavin Alexander ■ Peter Burgess ■ Andrew Campbell ■ Murray Chalmers ■ Gordon Dempsey ■ Chris Duncan ■ Tim Dunn ■ Simon Edmonds ■ David Edmunds ■ Angie Fraser ■ Ian Frechtling ■ Phil Gaby ■ Steve Gray ■ Mike Groves ■ Henry Harbuz ■ Sue Harlick ■ Joe Hindley ■ Richard Holyoake ■ Thomas Hyde ■ Ramiz Iskander ■ Nitin Joglekar ■ Bryce Julyan ■ Mike Kerr ■ Will Lamb ■ Chris Lee ■ James Macneil ■ John Marsh ■ Allister Maskery ■ Peter McCafferty ■ Mark Nankervis ■ Steve Salmon ■ Paulette Serpell ■ Greg Sharpley ■ Mark Spencer ■ Stuart Tucker ■ John Wemyss ■ Paul Whyte ■ Andrew Woodger ■ Joanne Wright

PEOPLE

The relationship builder

Dale Turkington's job title could almost be minister without portfolio at Beca, so varied are the projects he is involved in.

But he prefers 'steward' to describe his role on a range of projects spanning Auckland's Central Motorway Junction (CMJ), Sky City and Auckland University of Technology. A recent job completed under his guidance involved Beca acting as independent technical engineers for a banking group on an A\$800 million BOOT (Build Own Operate Transfer) scheme to deliver Sydney's Lane Cove Tunnel Toll Road.

"Beca has to be responsive and flexible, using its commercial and technical know-how to address clients'

needs," says the Canadian-born engineer. He's spearheading many of the growing number of Beca projects which involve innovative delivery methodologies: Lane Cove, the CMJ, and Auckland's Upper Harbour Bridge duplication project all involve Beca partnering with others to share the risks and rewards.

Another avenue Dale is using to grow crucial Beca relationships is through his role with the New Zealand Construction Industry Council. "We're driven by the belief in the need for industry standard guidelines on design documentation and have achieved buy-in from 150 key industry professionals. We want to create a level playing field for everyone involved in building construction," he says. The guidelines have received strong interest from the International Federation for Consulting Engineers (FIDIC).



Under wraps: Paragon II will share power and water systems with its nearby 'sister' building to maximise client investment.

BUILDINGS

Keeping customers happy

Competition between retail outlets in the big Singapore CBD shopping centres is intense, and tenants of these high-end stores therefore demand maximum flexibility in outlet design to enable them to offer the most enticing and comfortable shopping experience.

The 21,000 m² six-storey, two-basement Paragon II shopping centre on Orchard Road is owned by Singapore Press Holdings (SPH) – a long-term Beca client – and is one of only two retail sites currently under construction in Singapore's CBD.

Beca has provided mechanical and electrical services design on the project, integrating its knowledge of tenant

requirements in premium retail locations to maximum effect. The design has had to be sufficiently flexible to cater for changing markets and tenant demands, including extreme capacities in lighting and air conditioning loads, ventilation systems and data and communications infrastructures. "The level of detailing and coordination is evident. We can trust Beca to go the extra mile to attend to all our needs," says Michael Chin, SPH's senior vice president of Properties and Production.

The Paragon II, due to open in October, has already experienced large scale take up of leases, and will be linked to the adjacent Paragon shopping centre, also owned by SPH. To make best use of the client's investment in the plant of the original Paragon building, Beca is advising SPH on a scheme that will see the two buildings sharing power and chilled water systems.



Man of action: Dale Turkington (above) has taken the role of 'steward' on a range of projects, including new work by Beca at Auckland's Sky City (above, right).



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PEOPLE

A parallel course

Commitment. Teamwork. Focus. It's all in a day's work – and an evening's training – for Beca structural engineer, Jon Dolan.

Jon and his team of eight from Auckland's 'West End' club recently won divisional gold at the National Rowing Championships, held in the stunning landscape of Twizel in New Zealand's South Island. He is also training to be part of a team heading to North America in October to race at the major Canadian university regattas and the 'Head of the Charles' race in Boston.

Jon and his teammates regularly train between 15 and 20 hours a week to prepare themselves for the physical and mental battles of racing. But it's these same battles that give him the confidence and positive attitude to approach any challenge at work. Jon's work on the Freeflow project – an alliance between Transit, Beca with Parsons Brinckerhoff, Fletcher Construction and Higgins Contractors – has some rowing parallels, including the need for a quality performance and a very strong team focus. He says, "As a team sport, rowing demands your best effort and trust in your team that they're doing the same. The very same commitment is required in team projects like Freeflow."

Although Jon's longer term rowing goal is to win the men's premiere eights title, for now his sights are on Canada in October. Meanwhile, at Beca he's focusing on developing his structural design and project skills.



Early risers: Jon (second rower from right) and his teammates briefly relax during an early morning training session.

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