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Inside this issue:

- 1 Current Projects
DOC -Christchurch
- 2 Ashburton Art Gallery
- 3-7 RICS articles
- 8-9 Social Events

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THE FULL MEASURE

Department of Conservation Fit-Out Project – Moorhouse Ave, Christchurch

Recently completed within budget, The Department of Conservation’s new offices in Christchurch are being hailed as a winning formula of great design, simple yet effective aesthetics, with resultant working spaces simply called ‘enjoyable’ by those using. Coupled with the high standard of fit-out work completed onsite, the new offices overseen by Maltbys Christchurch office, as Professional Project Manager, Quantity Surveyor and Engineer to the Contract, have been a real success for the Department of Conservation. Project fit-out works were undertaken over stages, dictated by the staged main base build. A seismically constructed link way enables efficient internal access between the two base build structures for staff. Electronic access control is employed for ease and control of operations, and the mixture of open plan, multiple meeting dens and rooms, modern kitchen, dining and amenities rooms, complements the successful working environment created. The access control system employed also allows DOC the flexibility of being able to sublet with ease in the future should the need arise.



Current Projects

Wellington Office

Strathmore Community School
Foodstuffs - Dannevirke
Christchurch Schools
Wellington Zoo The Hub
SPCA Project Rehome
Pahina O Tokelau Church
Wellington Housing Trust
Development
Wellington Zoo-Meet the Locals
DOC- Christchurch
Reinstatement Estimates
Fortune Manning
MOE - New Schools
Cunningham Tce

Auckland Office

Rotorua Police Station
Sunnydene Special School
Sir Keith Park Special School
MOE Kura Redevelopments
Holy Trinity Cathedral
Westhaven Cycle & Walkway
Pasadena Beach House
Shed 10 Cruise Terminal
Aotea Centre Weathertightness
Marsden Cross Trust Board
Marlborough Primary New Admin
Auckland Radiology
Kerwyn Street Strengthening
House Reinstatement Estimates
Old Mt Eden Prison Conservation

Queenstown Office

Barley Station
Greenstone Tce
Savanna Management
Coptborne Stage 2
Speargrass Flat Road
Fong Gabler House
Rink House
Summerfields Estate

Christchurch Office

Ashburton Museum & Art
Gallery
Methodist Church
Idris Road
Reinstatement Estimates

Ashburton Art Galley



Ashburton Art Gallery and Heritage Centre

Maltbys are proud to be associated with the new Ashburton Art Gallery and Heritage Centre currently being constructed in West Street, Ashburton. This \$6.2 million integrated cultural project, being serviced from our Christchurch office, is due for completion of the base build in April 2014.

The facility is destined to become the new home to the Ashburton Art Gallery, the Ashburton Museum, and the Ashburton Family History Group, and will also house the Council Archives and the Community Archive Collection.

Incorporated features are:

- Ground floor Climate Controlled Museum, Archive Storage and Conservation facilities.
- Upper floor Climate Controlled Art Gallery, Art Storage and Conservation facilities.
- Art Gallery Exhibition Space incorporating new sound and light gallery for multi-media presentations.
- Feature Museum Exhibition Fit-out by a leading NZ designer in this field.
- Multi-use dedicated education space.
- Café and retail space.

Building features are:

- An imposing building well located and incorporating the use of a precast concrete structure to provide a stable and acoustically acceptable environment within.
- The use and installation of high quality integrated main and auxiliary services.
- Open air plant platforms housed within external acoustic designed walls.



An extract from RICS Construction Journal written by Joe Martin, Executive Director BCIS



Joe Martin looks at the history and increasing importance of life cycle cost planning

A puppy is not just for Christmas...

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Most investments bring with them long-term financial and resource commitments. Just as some dogs require more food and more exercise to keep them healthy, so some building solutions require more maintenance, energy, etc to keep them functioning to the required level of performance. Taking account of these future costs at the time of the initial investment decision, or reviewing them to optimise future expenditure, is the basis of life cycle cost planning.

Peter Stone, who wrote some of the seminal books on building economics¹ in the UK, argues that life cycle costing (LCC) had its own distinctive cycle. In short, he claimed, every 13 years LCC became the next big thing. He was correct in that the obvious advantages of making decisions on this basis have had many advocates, all of whom have in the past struggled to overcome the construction industry's obsession with initial cost. This time round, however, LCC is here to stay.

So why now? Over recent years the construction industry has been compelled to make the grudging acknowledgement that it cannot continue to commit to excessively high levels of future expenditure, and that if we are to control future spending we need to take cost into account in the buildings we are

constructing today. The search for best value, the savings required in the UK government's Construction Strategy and its commitment to building information modelling (BIM), are in large part based on the reductions in operating costs that can be achieved by life cycle cost planning.

Plainly, we have learned from the lessons of the 1960s and 1970s, when public buildings were put up with little thought about how their future maintenance was to be funded. As a consequence of this the application of LCC will, therefore, be mandated on all public sector building investments. The Treasury's *The Green Book: Appraisal and evaluation in central government*² stipulates that: "The costs and benefits considered should normally be extended to cover the period of the useful lifetime of the assets", and details how LCC should be applied in the public sector. In the private sector, where construction projects are subject to the same decision making processes as other investments, consideration of future running costs will form part of that decision.

The sustainability agenda also requires that construction decisions be made in the light of future carbon equivalent outputs from building projects. This will be done in a similar way to the life cycle cost plan, and will also be based on the consideration that current, future cost and carbon are part of delivering value for money from any investment.

Guidance and standards

RICS has long been a proponent of LCC. In the 1980s one of its "next big thing" cycles was sparked by the work of Roger Flanagan and George Norman³. In response, RICS produced a guidance note⁴, which was subsequently expanded and included in the *Surveyors' construction handbook*⁵ in the 1990s.

It is interesting to note that these were published exactly 13 years apart.

A more nine years later BCIS and the British Standards Institution (BSI) produced a supplement to ISO 15686-5⁶, *The standardised method of life cycle costing (SMLCC) for construction procurement*⁷. This sets out the components as follows:

- initial costs – design and construction
- cost in use – maintenance, operation and occupancy
- end of life.

Maintenance costs include:

- Renewal – major replacement, subsequent refurbishment and adaptation and redecorations
- Maintain – minor replacement, repairs and maintenance (planned), unscheduled replacement, repairs and maintenance (reactive) and inspection and monitoring (proactive).

Operation costs are the other costs that relate to the building and include:

- cleaning
- utilities – fuel, water and drainage
- administration costs – property management, waste management and disposal
- overheads – property insurance
- taxes – rates and other taxes payable in connection with owning the building.

Occupancy costs are those costs that relate to the use of the building, and will be client and project specific but may include, for example:

- reception
- occupants' security
- telephones
- post room
- ICT and IT services
- catering and hospitality.

The SMLCC and its predecessor guides have generally concentrated on the application of LCC to cost planning for investments in new construction projects. However, the techniques and principles can equally be applied to improving the management of existing buildings. For

RICS Extract cont

An extract from RICS Construction Journal written by Joe Martin, Executive Director BCIS

RICS CONSTRUCTION
JOURNAL

organisations with large property portfolios that are trying to control their future expenditure, the introduction of a life cycle cost plan is a key to understanding and managing their maintenance and operating costs.

The BSI committee responsible for service life planning is currently producing a guide to LCC for buildings currently in use⁶. The RICS representation on this committee is coordinating this standard with the development of NRM3 – the new rules of measurement for maintaining and renewing constructed assets.

The development of the new rules of measurement provides a consistent elemental data structure across the *Standard form of cost analysis*⁹, namely NRM1¹⁰ and NRM3. This allows for the development of a capital and maintenance order of cost estimates, cost plans and maintenance delivery plans. Furthermore, NRM3 provides a consistent data structure for the information needed to carry out these tasks.

Doing the calculations

Basically, LCC is systematically thinking about the future ramifications of current decisions. For any given building it simply requires the documentation of all construction costs, both now and in the future. While each calculation is simple, it may need to be carried out for thousands of individual components on a building, making it rather more complex.

Because the costs occur in different time periods they need to be adjusted for inflation and the changing time value of money. This is normally done by discounting future costs to express them at net present value. The time value of money reflects the principle that, generally, people prefer to receive goods and services sooner rather than later, and it can be measured by the real interest rate on money lent or borrowed. The discount rate is based on an estimate of interest rates adjusted for inflation.

The key information required for an LCC calculation is therefore:

- the discount rate
- the life of the investment – the study period
- the cost and frequency of future payments (at the component, elemental or total building level as appropriate). This will include the life of the element or component, and the maintenance requirement of the element or component
- end of life costs.

The most influential decision on the outcome is probably the choice of discount

rate. In the public sector the Treasury publishes discount rates to be used in its Green Book, currently 3.5% for periods up to 30 years, declining thereafter. In the private sector it will need to be agreed with the client.

The period over which the calculation is to be carried out – the study period – is normally the life of the investment, but it may be the life of the building. For some private sector clients, particularly in retail, the investment period may be less than 10 years. For economic appraisals, that form part of a wider environmental or sustainability assessment, it might be over 100 years.

The life of each element or component needs to be estimated in order to account for replacements during the study period. This may be the physical life, but other causes of obsolescence need to be considered, such as economic, functional, technological, social and legal. The maintenance requirements for each element or component also need to be estimated⁷.

The cost of replacements, maintenance and any costs or values that arise at the end of the study period will also need to be estimated. These streams of cost must subsequently be discounted to arrive at the net present value.

It should be borne in mind that all life cycle cost plans are predictions and that the input data therefore constitute estimates, so the plans should be subject to such techniques as sensitivity analysis, risk analysis, factoring and smoothing for reporting.

Sources of data

The choice of the cost data required should be straightforward for quantity surveyors. Life cycle data and maintenance requirements are available from a variety of sources including:

- BCIS Building Running Costs Online – component life data
- BCIS Occupancy Cost Plans containing maintenance and cleaning requirements for elements and components
- Building and Engineering Services Association *Standard maintenance specifications for building services* (SFG20).
- Chartered Institution of Building Services Engineers Guide M contains a table of plant life expectancies.

All of the above sources have been, or are being, restructured in accordance with the NRM3 data structure.

+info

- ¹ PA Stone, *Building design evaluation costs in use*, E B F Spax, London, 1967
- ² HM Treasury, *The Green Book: Appraisal and evaluation in central government*, Treasury Guidance, TSD, London, July 2012
- ³ Roger Flanagan and George Norman, *Life cycle costing for construction*, Surveyors Publications, 1983
- ⁴ *A guide to life cycle costing for construction*, RICS, London, 1986
- ⁵ RICS, *Surveyors' Construction Handbook, Part 2, Section 2, Life cycle costing*, 1999
- ⁶ ISO 15686-5 *Buildings and constructed assets – service life planning Part 5: Life cycle costing*, International Organization for Standardization, Geneva, 2008
- ⁷ BCIS and BSI, *Standardised method of life cycle costing for construction procurement* (PD 15686S), BSI, London, 2008
- ⁸ BSI, BS 8544 *Guide for life cycle costing of maintenance during the in-use phases of buildings*, not yet published.
- ⁹ BCIS, *Elemental standard form of cost analysis: principles instructions, elements and definitions*, BCIS RICS, London 2012
- ¹⁰ *New Rules of Measurement – Order of cost estimating and cost planning for capital building works* [NRM1], RICS, London, 2012

Conclusion

Life cycle costing, both as an initial appraisal technique and as a management tool for buildings in use, is a key process in ensuring that clients get value for money from their buildings.

I am certain that we have broken the 13-year cycle, that LCC is now an integral part of project evaluation and that delivery and a detailed maintenance and operation plan will be one of the most important outcomes of the introduction of building information modelling. In this context, the importance of NRM3 cannot be overstated because, for the first time, it provides an explicit link between capital cost planning and maintenance cost planning and the sources of information. ●

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Related competencies include
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MALTBYS

An extract from RICS Construction Journal written by Les Pickford, freelance writer & editor

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BUILDING INFORMATION
MODELLING

RICS is using building information modelling (BIM) on its London head office and plans to share its experiences with members and industry. In the first of a series of articles following the project over the next year, **Les Pickford** talks to the main players involved and asks about the benefits and challenges

BIM at work

The UK's *Government Construction Strategy* requires "collaborative 3D BIM (with all project and asset information, documentation and data being electronic) on its projects by 2016" and is part of UK's government's aim to reduce its construction costs by 20%. There is also increasing BIM activity in the private sector, propelled by an industry still trying to understand its impact on smaller projects, the supply chain and the wider property and construction world.

Given these drivers, RICS established an internal BIM group to improve its communications with its members and industry. At the same time, Severn Partnership offered to create a BIM model for the RICS head office at Parliament Square (PSQ).

"We wanted to use the PSQ BIM project to enhance our facilities management operation," says Matt McDermott, RICS Sales and Marketing Director and catalyst for the BIM communications programme. "But we also wanted to help industry understand the challenges and benefits of a project, especially so that other occupiers of existing buildings can learn from our journey. If a client is undertaking refurbishments, I'd like surveyors to be able to discuss the benefits of BIM and have a compelling business case to add fee value. Severn volunteered to create a BIM model of PSQ because it is passionate about being RICS surveyors, this building and the BIM process. It was a great opportunity for everyone."

What's the plan?

Severn has laser-scanned PSQ and is in the process of delivering a 3D BIM model to RICS, which it will help the organisation understand how to use. "But it's not just

about the 3D model, it's about the information behind it and how everyone can share it and collaborate," says Mark King, 3D Modelling Project Manager at Severn Partnership.

Future steps in the project include:

- helping RICS to choose appropriate software and hardware and to plan how the model will be populated, e.g. data from ongoing building maintenance
- training RICS Facilities staff, and its refurbishment consultants and contractors, to use the model
- working with BCIS to include costs elements into the model. "We are lucky to have cost benchmarking experts working for us," says McDermott, "because not everyone has this resource."

It is clear that the RICS Facilities team will have to change the way it operates. "It is learning as it's going along; it's not just about purchasing a 3D model and putting it into a facilities management system," King suggests. "Real success for RICS will be in its ability to communicate the pros, cons, pitfalls, benefits, etc with others through conferences, training courses, white papers etc."

What are the benefits?

Paul Chidgey, RICS Head of Facilities, has some initial thoughts on benefits, but admits that it is still early days. "I'm still not fully aware of everything that we'll get out of it, but we are learning, I'm sure other benefits will become clearer."

For him the immediate ones include:

- using a 3D image to enable decision makers to understand how any major refurbishment will look
- potentially linking it with the RICS Venues operation so people hiring a room can see 3D images of how it could look
- condensing information into one place. There are cupboards full of operation



● Point Cloud of RICS main entrance

and maintenance manuals from the previous major refurbishment of PSQ, so information can be found if needed but BIM means that it is all in one place.

King echoes this last point and says a big benefit to RICS is access to facilities management information. "We've probably all heard stories of a building being delivered to a client, which is then given a vanful of paper drawings and DVDs containing information that it doesn't know what to do with. Ultimately, most of it just gets left in its box and is never seen again."

BIM gives you information almost at your fingertips, explains King, and software is being developed that make these models very interactive and usable. "If RICS can get that information working for them they will have something they've never had before in facilities management."

Existing buildings

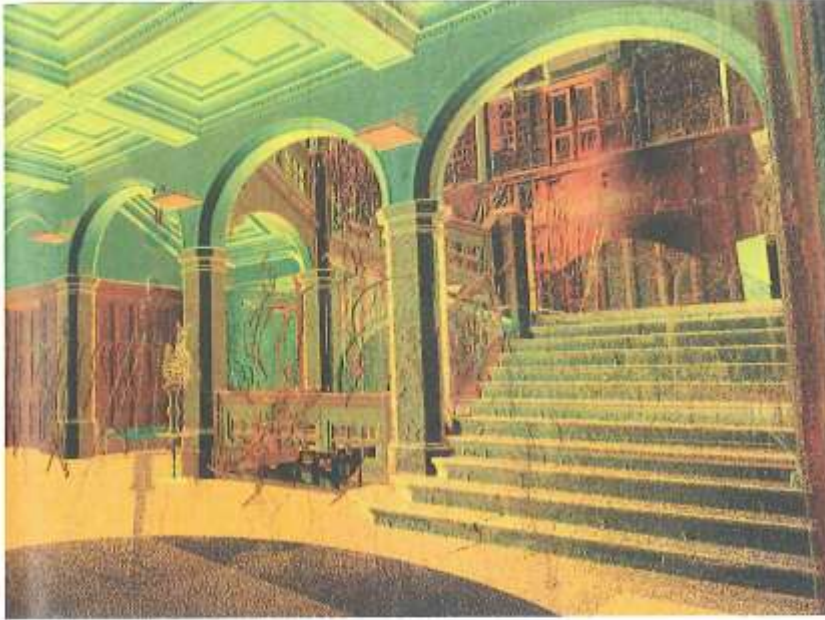
But while BIM on newbuild projects gets a lot of attention, it should not be forgotten that existing buildings could also benefit.

"The advantage for the lay person is that they can see how changes to an existing building will impact their environment," says McDermott. "This can mean improved staff engagement and happier clients. A model can provide a centrepiece for better communications." This focus on newbuild is probably because the tools have been developed with this in mind, says King. "They don't

RICS Extract

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RICS CONSTRUCTION
JOURNAL



take into account Victorian or Georgian architecture, and things being curved or ornate. So it makes it a little more difficult to model an existing building." But because it is predicted that 60% of buildings today will still exist in 2050, more will be refitted and refurbished rather than being newbuild. So BIM will increasingly be part of the process, he argues.

One of the main advantages for newbuild also applies to existing buildings – collaboration. "A 3D model allows you to collaborate with structural and mechanical and electrical (M&E) engineers, etc," King claims. "If you wanted to change all of the windows, for example, the model allows you to quickly create a windows schedule that can be used immediately by all parties." He adds that without the collaborative element of BIM, this process would probably mean architects and engineers annotating and emailing documents back and forth until a new specification is agreed, which could take weeks.

The PSQ survey

King says the process for surveying PSQ followed a standard route – with a measured building survey, a topographical survey, elevations, sections, etc – but also created a 3D model with the ability to assign information to building elements. "Previously, we may have done a building survey, and took the elevations from a laser scan, but delivered only 5% of the information we captured. With BIM we're giving much more information to the client."

King advises that conducting a laser scan of an existing building presents specific challenges, including:

- a lot of information is not accessible, e.g. because services such as plumbing are behind walls
- the building is occupied and so it is often difficult to access certain areas, e.g. server rooms due to confidentiality policies. It helped that RICS had CAD drawings to fill any gaps and Facilities staff available to help with access and scheduling of room surveys to work around conferences
- windows that do not open can prevent the laser scanning team from clearly seeing external control points used to ensure the accuracy of scans
- historic buildings tend to have smaller rooms with more corridors and doors to staircases. This makes the scanning process slightly more complex and time consuming, compared to modern buildings with more open floors, fewer walls and more columns
- clients often do not like any marks left in the occupied building. "If we return to a room, we'd like to use the same control points but we can't really mark the floor or walls as we can with industrial buildings," argues King. "This is why we try to start and finish on known fixed coordinates and complete a room in a day."

However, while newbuilds allow models to be populated with manufacturer's product details, existing buildings (especially historic ones) could have elements that are

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We wanted to help industry understand the challenges and benefits of a project, so other occupiers of existing buildings can learn from our journey

hundreds of years old or of unknown origin, so model details have to be populated from scratch. "For example, when doing M&E modelling we can scan a pipe but we don't know what it's made from, what flows through it, where it comes from or where it goes to," warns King. "So we will add parameters to drop-down menus so an engineer can click on the pipe and complete the details of its use (e.g. gas, water or electrics), and what it is made from (e.g. steel, iron or plastic).

"Not many organisations can afford to immediately populate a new model for an existing building," King adds. "But through ongoing building maintenance, this can be done room by room, window by window, door by door. Soon, RICS could have a very information-rich model."

The challenges ahead

As you might expect, being at the start of this 'learning journey' means there are quite a few challenges in the months and years ahead. But what are the key ones?

Skills

"We don't currently have the skills to truly realise the benefits of BIM," McDermott emphasises. "Using a BIM model and squeezing value from it is something we haven't done before. So it's a massive step and we'll need training."

King agrees that there will be a learning curve and says: "Some people may not have worked in a 3D environment before, and using vast amounts of information could be quite overwhelming."

However, the issue for Chidgey is that BIM skills are not inherent in his team's current working environment. "But I don't see it as solely a responsibility within Facilities. I also see possible partnerships with contractors and consultants and to build this into our cost

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RICS CONSTRUCTION
JOURNAL

BUILDING INFORMATION
MODELLING

model, I need to ask whether we need these skills internally, with the required resource levels, or bring them in as needed."

Model use

McDermott suggests there will also be a challenge because, generally, using the model will not be a daily process. "Populating the data won't happen until work is performed. As we are not completing the model during a big project we may not get the enthusiasm and buy-in you would expect. But over the next few years there will be many smaller PSQ projects and this will improve as the model beds in."

Information technology

"New hardware and software will probably be required, with all of the related training," says King. "Also, decisions will be needed about the IT environment around the model, for example will the data be held internally or in the 'cloud' and what are the security requirements?"

Working practices

Moving from a predominantly paper-based environment to an electronic one is likely to present the biggest challenge, King notes. "All organisations have people who will be adverse to change. So it's about managing them and getting their buy-in to this new way of working. You might have the budget to buy PCs and software, but it's the people who will ultimately make the project a success."

Chidgey says he also needs to find a balance between running the model and delivering a working building. "I probably won't get any thanks if I'm busily entering data to the system, and we're not getting carpets cleaned or walls painted. It's hugely exciting and it's going to have

some clear advantages, but we need to ensure there is a clear cost benefit."

What's in it for you?

"BIM is here to stay and will affect many surveyors, especially quantity surveyors (QSs)," says McDermott. "Their core skillsets can transfer into BIM management activity, and they can take advantage of the benefits that BIM offers. There is a massive challenge – the theory sounds great but the reality is hard, so QSs can help to make models and processes work well. Also, industry reports such as Egan and Latham all point towards collaboration, which is one of the key benefits of BIM."

King says that as BIM activity increases throughout the industry, surveyors are more likely to find it a requirement on projects, especially in the public sector. "But there's also a pull from private clients that can see the potential benefits. Main contractors need to use it for government work but the cost, time and quality advantages mean that they're increasingly looking to use BIM on all their projects. This is filtering down through the supply chain. As BIM gathers speed, surveyors should get involved, because this should lead to more work."

Implementing BIM on PSQ is a huge task for RICS and will need decisions on everything from IT requirements and skills, to working practices and data collection. "I hope that by sharing the lessons, our members will understand the challenges of developing a BIM model on an existing building," says McDermott "and how to create the right working environment for its successful use." ●

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RICS view point

The UK's largest client in the built environment is the government; it accounts for 40% of construction expenditure across a diverse range of sectors that are relevant to nearly, if not all RICS members. With the government's mandate requiring all its projects to adopt collaborative BIM by 2016, surveyors across all disciplines cannot afford to overlook its importance. Add to this the increasing BIM uptake in the private sector and you have a compelling case. Early adopters are likely to thrive, while those who do not will miss out on new found efficiencies and opportunities for growth that can directly impact the bottom line.

For quantity surveyors and project managers, opportunities include increased efficiency, demand for new roles such as the BIM/Information Manager and, with the arrival of NRM3, they have the tools to operate during the life cycle of built assets.

The RICS PSQ project and the work with government, industry and other institutions is paving the way for members to embrace this unique opportunity.

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More information

Government construction strategy
bit.ly/12ueWfu

Sir John Egan's 1998 report *Rethinking construction* bit.ly/LVyb4k

Sir Michael Latham's 1994 report *Constructing the team* bit.ly/mjcggy

Visualisation of RICS library from building information model



24 SEPTEMBER/OCTOBER 2013

Further +info

For library resources, go to www.rics.org/catalogue and search for "BIM"

The project team will be sharing its experiences through articles in the RICS professional journals and regular updates on www.rics.org/bim and LinkedIn discussion groups.

MALLTBYS

SOCIAL EVENTS

Auckland

Mid Winter Function

This year the staff were again looking for challenges and Ten Pin Bowling was the choice. No teams here, it was a straight out competition over two rounds. Everyone had a very different technique and some were very rusty on the first round.

After the first round Gary was out in front by quite a margin, but then Arthur & Phillip got into the swing and started to claw back that deficit. But in the end, the first round margin was too great and Gary won with the margin considerably reduced. It was so much fun that some stayed on for a third round.

To let the Auckland peak hour traffic subside, others went back to Ellerslie for nibbles and chatter. A lovely afternoon for all.

