Innovative healthcare design

Increased collaboration and coordination with BIM

"Beca has strived over the last few years to try and manage our BIM environment. Autodesk Consulting has helped us in actually producing solutions that work for us and our clients. Through the tools and processes we have set up on our projects, we are not only increasing communication and transparency to all stakeholders but we are enabling greater collaboration and understanding between all parties involved."

— Philip Smith
CAD Systems Manager
Beca

Introduction

Beca is one of the largest employee-owned professional services consultancies in the Asia Pacific. Established in 1918 in New Zealand with just three employees, Beca today has a substantial Asia Pacific footprint, approaching 3,000 employees in 19 offices across the world. Beca delivers a variety of consultancy services across the Buildings, Government, Industrial, Power, Transport and Water market segments. It operates from three main “hubs” – Australia, New Zealand and Asia – offering everything from engineering, architecture and planning services, to project and cost management, software technology and valuation services.

Healthcare is one of Beca’s largest market segments. It’s built over 300,000 square metres of hospital facilities in New Zealand alone. The Bay of Plenty District Health Board is one of Beca’s key clients, and it has been working with the team for over a decade.

Project overview

Beca was commissioned as the project manager and lead consultant for the Building Services and Seismic Structural design for a new Cathlab Facility at Tauranga Hospital. The building was built in 2011 and had several vacant levels, waiting to be fitted out. Originally intended to be a series of wards, the decision was made to develop Level 2 into a Cathlab Facility.

As one of the largest hospitals in the Bay of Plenty area, it was important that a range of cardiology services could be offered to the communities it serves. The hospital previously had distributed services across different floors and buildings, creating patient and workflow inefficiencies. The new Cathlab Facility however, will enable all cardiology services to be consolidated in one area and provide additional capacity for patients and improved work practices.

At the completion of the project, the client will require a schedule of critical maintainable assets. This will enable improved asset and facilities management for future development of the space. Having accurate equipment data can not only lower the cost of ownership of the facility but also improve the level of service by reducing the potential for downtime.

Complexity in design and time constraints

There have been a number of challenges to address on the project. Firstly, the requirements changed from wards to a Cathlab Facility, constraining the design process. There was limited space within the ceiling void for the number of services required. This meant collaboration between all of the design stakeholders was incredibly important.

Additional seismic support was also required for the services due to potential earthquakes. This is a requirement for buildings in New Zealand so that they can remain functional in the event of an earthquake. Walls, ceilings and services have to be seismically braced to prevent injury or death, further reducing the available space in the facility. There were a number of small rooms within the facility to be braced (creating potential for bracing clashes), adding to the design and construction complexity.

Finally, there were also various time constraints to contend with. The project is due for completion in mid 2016 and has a strict eight month timeline, meaning there was no room for error from working with potentially incomplete or inaccurate information. This meant it was crucial that information on the existing structure and services was entirely accurate. Therefore, coordination was critical not just between the
proposed designs, but also within the existing environment.

**Increased accuracy and close collaboration**

Initially, Beca recommended that a point cloud laser scan was used to capture the existing environment, concrete structure and services that were already occupying the space. This generated an accurate understanding of the current structure and parameters that the design team had to work to. A ‘capture it once and use many times’ mentality was deployed. This has enabled the team to work within the tight construction timeline because they could be confident that the information captured was entirely accurate and up to date.

The point cloud information could then be imported into Revit to inform the design process from the outset of the project and ensure accurate 3D models of the existing conditions were created. Proposals were then designed and documented by the Building Services and Structure design teams.

The Revit models were then imported into Navisworks, along with the point cloud data for coordination purposes. The team also undertook clash detection, not just on the new designs, but also on the existing models to provide an accurate comparison.

BIM 360 Glue was used to enable all design teams to communicate and rapidly publish design iterations to the cloud. This was beneficial as the teams were not all in the same place at one time, and so it brought far greater visibility to the project.

This also meant that Beca has been able to engage more easily with all the stakeholders involved, facilitating sign off on the project, allowing them to rapidly progress with the designs. Finally, BIM 360 Field is being used to capture data during the construction stage. This will allow the required asset list to be incorporated into the hospital’s existing asset management solution, as BIM 360 Field allows for a neutral data drop.

**Reduced timeframes**

By deploying a range of Autodesk tools, Beca has enabled a significant reduction in the time taken to capture, create and distribute information.

Brett Naylor, Technical Director and BIM Delivery Leader, Beca, comments:

“In the past, our clients have often had to spend anything between 6 to 18 months going round the particular facility and recapturing all of the information that’s already been created through the design and construction process. By working with Autodesk, we’ve been able to capture this critical data from day one, ensuring the client can effectively maintain and operate the facility.”

Autodesk Consulting has also been engaged to work with Beca to establish the workflows and methods for the application of BIM 360 and to help train both the Beca team, its project partners and the client.

Philip Smith, CAD Systems Manager, Beca, concluded: “Autodesk Consulting really has helped us to further our investment in BIM-based technologies by firstly getting to know our business, how we work, what are our drivers and most importantly, how we look to deliver successful outcomes for our clients.”

**Point cloud scan of the existing environment shown in Autodesk ReCap**

**Revit model of existing environment created from point cloud scan**

**Autodesk BIM 360 Glue and Field being used during construction**

**Strengthened relationship**

Autodesk provided Beca with its own Customer Success Manager who was dedicated to supporting the project and driving the right solutions across the business. The CSM has been able to quickly respond to Beca’s business needs and then channel the support needed throughout the project.

Brett added: “Our Customer Success Manager has not only ensured we had a very happy client, they have also provided us with the right knowledge and skills needed to help us win more projects and deliver better services right across the business in the future.”

Autodesk is important to Beca because we’ve always sought to build strategic relationships with our clients, design partners and vendors. The relationship we’ve built with Autodesk has allowed us to deliver world class designs throughout all our regions and deliver cost effective and very efficient projects for our clients.”

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**Vaughan Robertson**
Group Manager of Technology Strategy
Beca

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**Jon Williams**
Business Director of Practice Development
Beca

“Autodesk and its technology has been the perfect solution for this project. Autodesk’s tools work together so that information flows freely from the modelling suite to the field. That reduces risk, saves costs and provides certainty in project outcomes.”

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