

CBW OFFICE COMPLEX PROJECT – MELBOURNE, VIC, AUSTRALIA

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ABSTRACT

The CBW project has brought a new standard of office infrastructure and fit-out to Australia. Its prime Melbourne CBD location, state of the art facilities and unique layout and design have allowed CBW to instantly become a project synonymous with current best practice construction, sustainability and operation techniques.

Built by Brookfield Multiplex Constructions on behalf of owner and developer CBus Property, the complex incorporates two A-grade commercial towers totalling 76,000 sqm of office space, a retail precinct containing 5,000 sqm of tenancy space set around a pedestrian laneway and public realm, and three levels of basement car park(420 spaces) and amenity areas. Two integrated fitouts(Totalling 37,000m² NLA) were also completed by Brookfield Multiplex concurrently with the base construction.

The technical initiatives and innovations implemented on the project, closely linked with the sustainable development, will leave a legacy for future projects to utilise these improved initiatives.

The project was a resounding success for all stakeholders, particularly in the three pillars of project success- *Time, Cost and Quality*. A fourth and fifth pillar should also be added for this project, *Environment and Customer Satisfaction*, which were also exceeded with equal success.

KEY WORDS

Victoria, CBW, Melbourne, Brookfield Multiplex, Construction, Office tower, Green Star, CBus Property, Bourke Street

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1 INTRODUCTION

The west end of Melbourne's CBD has boasted some of the city's most dominant landmarks for many years. The Rialto, Bourke Place and the many distinguished buildings associated with the law district have become meeting points for the city's inhabitants. However in recent years development in this area of the CBD has been minimal, producing a less than modern aura in terms of facilities, ambience and style.

This aura has now well and truly been restored with the construction of the CBW Office complex. Bound by major roads Bourke Street and William Street (Hence the name **CBW**- **C**orner **B**ourke and **W**illiam), and also Little Bourke Street and Ramsay Lane, the complex has modernised the area and provided a landmark where inhabitants can meet and all can identify from any area of the city.

1.1 Site History/Heritage

The undeveloped site was first sold by the Government to Goldsbrough Wool Stores Pty. Ltd. in the 1800's. The wool merchants constructed a number of bluestone wool stores on the site and an office building across William Street which still stands today. Testament to the company's development of the site is Goldsbrough Lane, which was a roadway that ran through the CBW site and now still exists however has become a pedestrian walkway and part of the CBW retail precinct.

The site operated in this function until the mid 1900's when the wool stores were removed and two buildings constructed. The first was the purpose built Shell Petroleum headquarters which was one of the first buildings constructed in Melbourne using curtain wall façade. The second was the ACI building which was one of the first in Melbourne to be constructed using precast concrete panels.

In 1990 a development plan was established for the site where the Shell building was demolished leaving only a small rise car park at the bottom. The development plan did not come to fruition. The site was then acquired by current owners CBus Property in 1998.

1.2 Project Scope of Works

Construction of the complex, taking place over a period of just two and a half years, comprised the following scope of works:

- Full design and construction of the entire complex;
- Responsibility for gaining town planning approval, building permits and Certificate of Occupancy for the complex;
- Demolition of a fifteen storey building, fourteen storey building, eleven storey building and two storey car park on the site;
- Excavation of the entire site fifteen metres below street level without interruption to pedestrian and traffic flows on one of Melbourne's busiest corners;
- Construction of the 181 William Street building- a twenty-seven storey A-grade office tower containing 49,000m² of net lettable area;

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- Construction of the 550 Bourke Street building- a twenty storey A-grade office tower containing 27,000m² of net lettable area;
- Construction of an independent three storey retail building located between the office towers;
- Construction of a three level basement car park(420 spaces) and amenity area underneath the site;
- A retail precinct and public realm between the two towers including thirty-six retail tenancies of varying size, public area paving and a cushion roof canopy;
- Integrated fit out of fourteen floors of the 181 William Street building for IAG Insurance, completed ready for occupation;
- Integrated fit out of five floors of the 181 William Street building for Blake Dawson Lawyers, completed ready for occupation;
- Achievement of Green Star Office Design Ratings for both office towers;
- Assistance in submission of Green Star Office As-built rating and ABGR rating for both office towers;

This report will describe the outstanding achievements accomplished throughout the project lifecycle, major project challenges encountered and aspects of the project delivery leadership and management that allowed the project to be such a success.



2 ACHIEVEMENTS AGAINST PLANNED TARGETS

A number of key achievements in critical areas contributed to the overall success of the CBW project and in most areas planned targets were exceeded.

2.1 Stakeholder Satisfaction

The single-most important success Brookfield Multiplex achieved for the project was the level of satisfaction shown by the client and owner of the building, CBus Property, the tenants and the building manager. These stakeholders have frequently praised the construction process, end-user functionality and quality of the completed project. Andrew Pitchford, Senior Development Manager for CBus Property, typifies this praise with the following quote regarding the CBW project,

“The result speaks for itself, the project was delivered ahead of a very tight programme, to a standard that is exemplary and with relationships between all parties including the design team, Planning authorities, site personnel, our consultants, our customers, that is the tenants, and ourselves that unanimously reflect pride in an outstanding achievement.”

2.2 Time

What seemed like a fairly tight program at project commencement, Brookfield Multiplex was able to complete all separable portions between 44 and 86 days ahead of the contract completion date. This came as a result of meticulous planning and universal focus of the end goal from all members of the project team. Below is a table comparing contract completion dates against actual completion dates for the project’s associated separable portions:

Separable Portion	Description	Contract Completion Date	Actual Completion Date	Days ahead of Contract
1	181 Building- Lvl Grd-15(incl. IAG Fitout)	31/05/08	18/04/08	+44 days
2	181- Lvl 16-28	03/10/08	31/07/08	+64 days
3	181- Remaining areas	03/10/08	15/08/08	+49 days
4	550 Building	03/10/08	15/08/08	+49 days
5	BD Fitout	31/10/08	08/08/08	+86 days

Table 1: Contract Completion Dates Vs Actual Completion Dates

2.3 Environmental Sustainability

One of the critical characteristics of the project for both Brookfield Multiplex and CBus Property was maximising environmental sustainability from a design focus through to construction and operation of the complex. These initiatives were implemented into the project through a number of avenues as listed below.

2.3.1 Green Star Rating

The Green Star Rating system (Developed and administered by the Green Building Council of Australia) reviews and awards points to a project based on a number of varied criteria set out in a rating tool that relate to minimising the whole of life effects of the project on the environment. These criteria cover the following areas specific to the site:

- Project management;
- Energy efficiency;
- Water efficiency;
- Ecological effects;
- Materials usage;
- Transportation considerations; and
- Occupancy comfort based on surrounding environment;

Based on the above criteria both the 181 William Street building and the 550 Bourke Street were awarded 66 points each, clearly exceeding the 5-star requirement of 60 points. These two buildings were the first privately-owned to achieve this feat which is a great reflection on the commitment shown by the project team to providing a truly environmentally sustainable complex.

Further to the Green Star Office Design Rating, an As-built Rating is also currently in the process of being applied for. The As-built rating can only be awarded once the building is complete and reviews the as-installed nature of the complex's environmentally sustainable features.

2.3.2 NABERS(ABGR) Rating

Whilst the Green Star rating tools review a range of environmentally sustainable features of a project from conceptual planning through to operation, the NABERS (Formerly ABGR Rating) tool focuses implicitly on the energy usage and efficiency of an operating building. It monitors the energy usage of a building over a year-long duration based on building occupancy levels, size and features. Accordingly an energy efficiency or NABERS rating is then awarded.

Both towers in the complex have targeted a 4.5-star NABERS rating. This rating can only be awarded once the building is fully operational and the relevant data collected for one continuous year. Based on a submission early in the project, NABERS has granted both towers a 4.5-star commitment agreement. This is granted early in a project after review of a submission that models the likely or anticipated energy usage of the building and shows the initiatives and planning put in place by a project to commit to applying for and achieving a certain NABERS rating.

2.3.3 Waste Recycling

Probably the most critical element of Brookfield Multiplex's environmental focus was the commitment to project waste recycling. A concerted effort was made to ensure that the maximum amount of waste leaving site was recycled. Through close coordination and planning

with the waste management contractor, detailed descriptions of the amount of waste leaving site and the subsequent amount of this waste available and actually recycled was frequently reported and reviewed. Below is a sample quarterly waste report for the project.

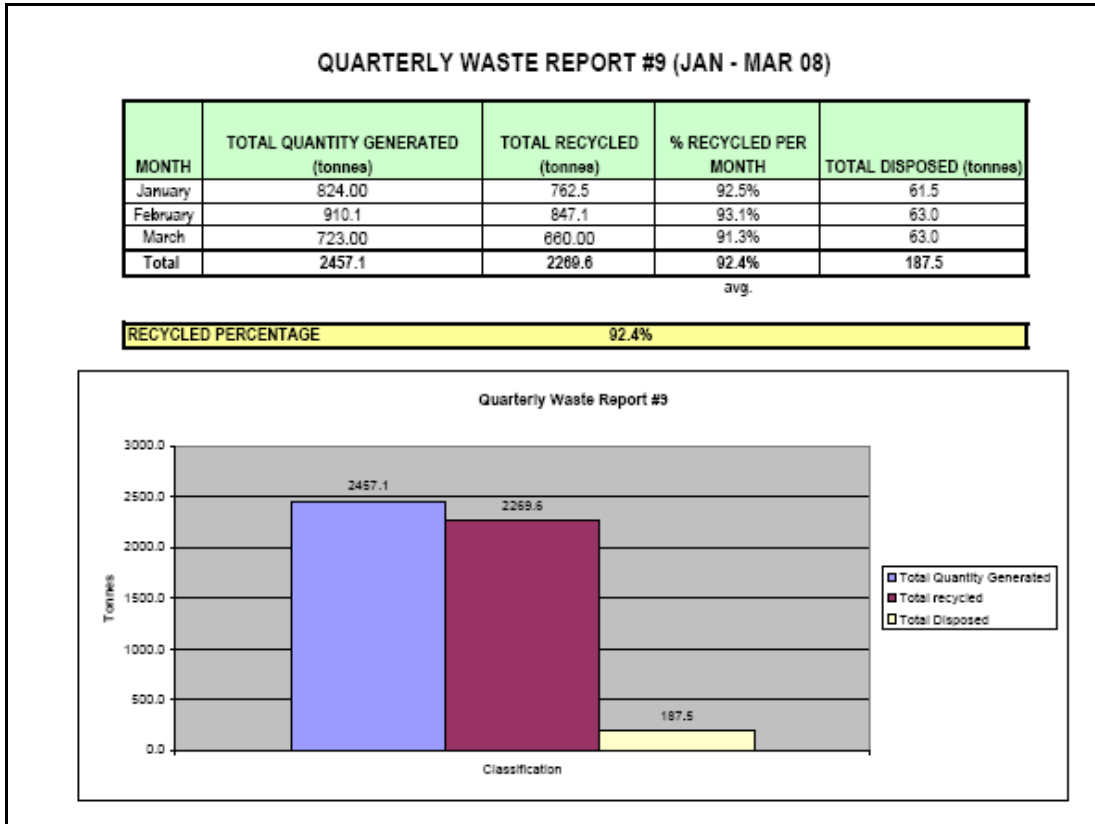


Figure 1: CBW Quarterly Waste Report(January-March, 2008)

Of the approximate eighteen months spent on construction of the complex 153,603 tonnes of waste was removed from the site. Of this 139,481 tonnes was able to be recycled in some way, amounting to a recycling percentage of 91%. Even with Brookfield Multiplex’s emphasis on recycling this figure was well above expectations and also well above the industry standard for similar projects.

2.4 Safety

Under recent legislative changes, buildings designers are required to ensure the safety of all users are accounted for in design, both in construction and operation. Although not mandatory at commencement of the project, as an industry-leading organisation Brookfield Multiplex instigated this requirement. Accordingly twenty-five amendments to the design were tabled, with thirteen of these implemented as vital to the safe use of the building. These include:

- Permanent platforms within services risers for installation and ongoing maintenance;
- Canopy structure realigned to allow emergency landing of BMU;
- Precast columns used throughout to allow early and safer climbing of protection screens;

3 MAJOR PROJECT CHALLENGES

The location, design and high profile nature of the project created unique complexities and difficulties during construction. Sound management and planning turned these difficult situations into possible opportunities.

3.1 Planning

Brookfield Multiplex understood that a project of this magnitude would not be a success unless effective planning was undertaken upfront. This was particularly evident from the first phase of construction- demolition and excavation.

Initially the brownfield site contained two buildings and a low rise car park to be demolished. The fifteen story building impeded on the north half of the new 181 William Street building floor plate, hence to optimise program excavation and construction of the south section commenced whilst the existing building demolition occurred. Once complete, construction of the north half of the building occurred and tied to the south. Therefore the building was effectively built in two halves three months apart thanks to astute initial planning and clever structural redesign.

The figure shown on the next page details how the demolition, excavation and construction was broken up within quadrants on the site between March and June 2006.

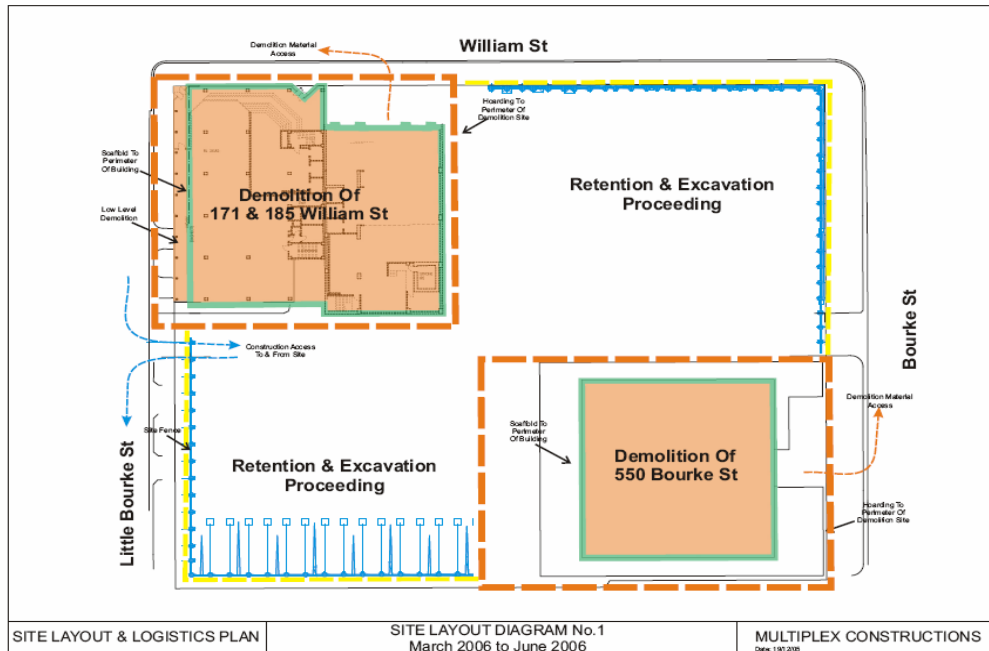


Figure 2: Site Layout between March and June 2006

Furthermore, construction optimisation was never more evident than in the façade systems installation. In what could be termed *‘Textbook Construction’* for all levels the façade was installed with no delay. Immediately once structure and protection screens were clear façade was installed and completed. This allowed accelerated and safer commencement of works by finishes trades and earlier completion dates for the project. This example of construction technique is now being used throughout the Melbourne CBD.

3.2 Cost

The initial scope did not include the second tower but was later added. From a cost point of view this was quite a complex addition. The close working relationship between client and builder allowed the second tower to be added as a variation valued at \$80 million. Furthermore, the variation was absorbed into the project whilst constructing the initial scope and with no time or cost implications normally associated with such a large variation.

3.3 Complexity

Simultaneously constructing two high rise buildings side by side was the major construction complexity associated with the project. Spacing between the two buildings measures only 12 metres at its closest point. Safety, procurement and logistics were all inherently affected by this simultaneous construction. Strict access permit systems and dedicated teams for each tower allowed both towers to progress safely and in harmony.

3.4 Site Logistics

Due to the separable portions of the contract, a section of the basement and fifteen levels of one tower opened as operating offices whilst the remaining twelve levels and the adjacent tower continued construction. The logistics of moving tenants safely through construction zones and ensuring availability of evacuation paths was initially a logistical nightmare. After many stakeholder meetings and reviews, it is a credit to all involved that construction continued to forge ahead of program after initial occupation.

3.5 Environment

Many complexities were encountered environmentally throughout the project. Both Green Star and ABGR ratings were targeted and both push the barriers of what is environmentally achievable. Accordingly a number of innovative and world-leading systems were incorporated into the project including:

- A black water treatment plant;
- Peak load lopping using diesel generators;
- A fire water recycling system;
- Dali lighting control system;
- A reverse osmosis plant connected to the black water treatment plant for cooling tower make up water; and
- The first use in Victoria of a destination control lift system.

4 PROJECT DELIVERY LEADERSHIP AND MANAGEMENT

4.1 Project Team Relationships

A key driver to the success of the overall project was the close and productive relationships of team members through the entire course of the project. From commencement Brookfield Multiplex clearly defined the goals of the project to all involved and led the team in ensuring all decisions made were to the greatest benefit of the project.

The team consisted of a plethora of companies due to the magnitude of the project. These included the client, project managers, design consultants, cost consultants, compliance consultants and of course the many trade contractors. Despite these many and varied relationships, the cooperation and coordination felt throughout all parties funneled to the common goal of producing the best outcomes possible for the project.

4.2 Innovation and Technical Initiatives

The forward thinking and enterprise of the CBW project team was never more evident than in its willingness to incorporate technical initiatives and innovation into the project. Despite risks associated with incorporating new and relatively untried systems, Brookfield Multiplex focused on producing the best possible project outcomes from environment, quality and function perspectives. Proposal reviews and investigation of risk/benefit analysis were undertaken to consider the opportunities available in implementing new technology into the project. Below is a selection of these initiatives.

4.2.1 Lift Destination Control System

The CBW project was the first in Victoria to introduce the destination control lift system. This innovation minimises energy usage and benefits time efficiency by allocating passengers to specific lift cars rather than passengers choosing their own as occurs with a conventional lift system. This technology allowed the lift banks on the project to be reduced by two lifts when compared to a conventional lift system. The system was also integrated with the speed stile and building access system.

4.2.2 Blackwater Treatment and Recycled Water System

Given Victoria and Australia’s current enduring drought conditions and poor water storage levels, responsible water usage is becoming a common point of discussion throughout the country. Recognising this, the CBW project designed and installed a water reticulation system for the complex centred on the maximum use of recycled water possible. The system operates by collecting all blackwater from the site to tanks located in the basement. These tanks collect all waste water from the site with the exception of storm water and trade waste. Below is a schematic diagram showing the basic process of the CBW blackwater recycling scheme.

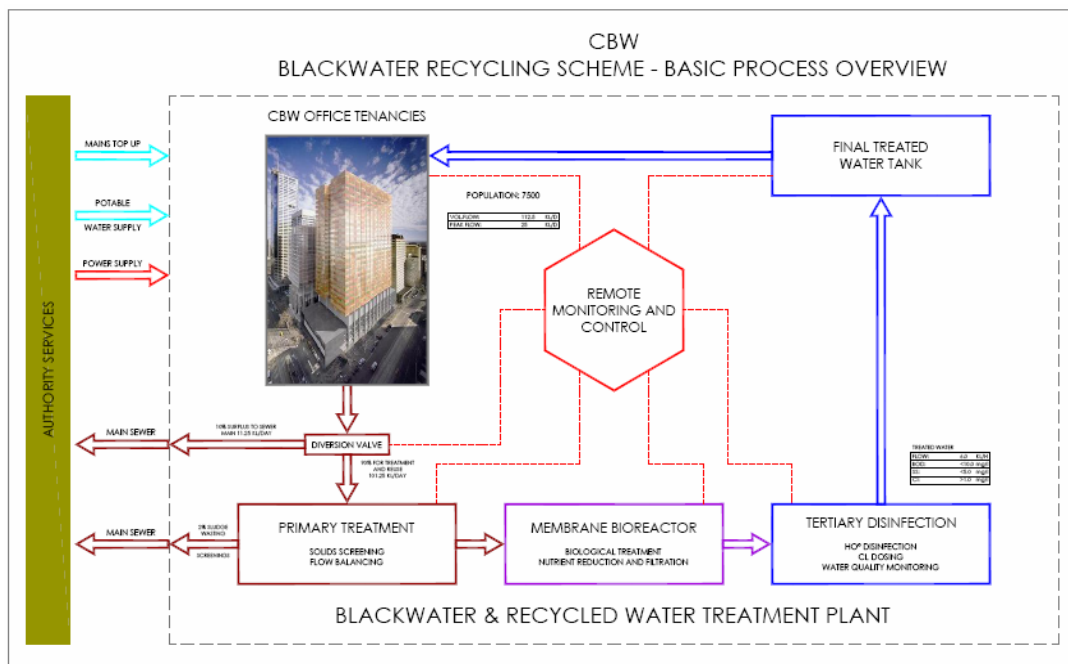


Figure 3: CBW Blackwater Recycling Scheme Diagram

4.2.3 Dali Lighting Control System

The DALI lighting control system was used exclusively throughout the project. Only in its infancy in terms of development and commercial application, the system allows light fittings to have much more flexibility in their function, uses and programming. For instance, each fitting is independently addressed rather than being just part of a circuit. Therefore each individual light fitting in the project can be programmed to differing guidelines dependant on the application required. It enables dimmable ballasts, transformers, emergency fittings and controllers from different manufacturers to be mixed and matched into a single control system. As the system is in its early years, the range of products available for use with the technology was somewhat limited prior to the commencement of the CBW Complex. The size of the project and the team's insistence that light fittings specified must be DALI compatible prompted lighting manufacturers to product new ranges of fittings to accommodate the project. This will have lasting effects for future projects and the industry as a whole.

4.2.4 Peak Load Lopping Using Diesel Generators

As part of the sustainability initiatives included in the complex, peak load lopping capabilities have been incorporated. In summary, once the mains electrical load demand of the complex reaches a preset figure (around 90%), the stand-by diesel generators start, synchronise with mains power and then transfer the building electrical load from mains to stand-by generator power. This takes demand off the mains grid, allowing the supply authority to maintain adequate supply for other customers.

4.3 Design Process

Brookfield Multiplex took on design risk for the project at an early stage and hence had a major contribution in the design process. Design consultants associated with the project were led and driven by Brookfield Multiplex's internal design team. This internal team exposed opportunities within the design to construct the works more efficiently and effectively. The above was made possible due to strong leadership in the planning and control of design and construction operations. Implementing the 'Safety in Design' guidelines was one such example. A design program was also monitored in conjunction with the construction program and the consultant-builder-subcontractor link was managed to operate as if they were the one organisation.

4.4 Industrial Relations

The successful project team relationships on the project can again be verified through the site's industrial relations cooperation and record. For the entire two and a half years of the project there was no lost time due to Industrial Action. A consultative committee was set up for the duration and frequent meetings were held to discuss and resolve any potential and current issues.

5 CONCLUSION

The project was a success on all levels, highlighted by the meticulous and innovative planning from commencement of the project.

Due to the unwavering focus of all involved very few projects of this type have been able to match the impressive program results achieved.

The unprecedented project-wide environmental initiatives in place for the life of the project were a critical requirement for the project and embraced by all.

Industry leading sustainable development, most of which was developed specific for the project, is now being incorporated on all similar projects.

The technical initiatives and innovations implemented on the project, closely linked with the sustainable development, will leave a legacy for future projects to utilise these improved initiatives.

Project team relationships and information flow were critical driving forces in the success of the project.

All of these factors have combined to highlight the CBW project as the current industry benchmark for high quality, environmentally sustainable, technically efficient mixed use construction and development.

ACKNOWLEDGEMENTS

Brookfield Multiplex Constructions would like to acknowledge all parties including the client CBus Property, consultants, subcontractors and suppliers in working together toward the common goal of making the CBW project the success that can be seen today in the finished product.