

## Research Report

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# Building Information Modelling (BIM): Australian Perspectives and Adoption Trends



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**CIBER**

CENTRE FOR INTERDISCIPLINARY BUILT ENVIRONMENT RESEARCH

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## **Executive Summary**

Following on from our earlier report, which introduced BIM concepts and revealed the state of art in BIM on the global stage, this report focuses on BIM in the Australian context. It reveals that contrary to the perceptions of many in the industry, Australian BIM practitioners are in the vanguard of global practice, engaging in ambitious demonstration projects of the highest magnitude of complexity. They are also active in the field of research and development, both in terms of basic research undertaken by universities and applied research driven by industry/research collaborations. These have progressed well beyond the stage of problem identification, where solutions are being developed for industry deployment. It is increasingly the case that education and training is being seen as the impediment to further BIM adoption, though a number of Australian professional bodies, TAFEs and universities are now developing highly relevant programmes.

Widespread adoption of BIM is not without its challenges: issues of best practice guidance, standardised information libraries, process and data exchange, together with an overarching regulatory framework need to be developed. However these challenges are being currently addressed, with ever-increasing urgency as experienced practitioners are placing increasing demands for solutions upon those charged with their development.

In short: widespread adoption of BIM in Australia is no longer an "if" so much as a "when". Forward thinking firms and practitioners are adjusting their strategic mindset to this new paradigm, recognising the potential for sustained competitive advantage arising out of the marriage of new technologies and new methods of working.

## 1. Overview of BIM in Australia

Adoption of BIM concepts in Australian construction industry can be traced back to a decade or earlier. However, in the past five years or so the interest in BIM adoption has intensified among numerous stakeholders in the ACE sector. In essence, momentum is building in the Architectural, Engineering and Construction (AEC) sector in Australia for adopting BIM based practices. The adoption trend of BIM is backed up by numerous initiatives engaging and informing the stakeholders about the potential productivity gains and best practices. The aim of this report is, therefore, to provide an account of BIM adoption in Australia and identify opportunities and possible future developments in the Australian Context. It initially highlights the current position of BIM adoption in Australia.

Findings of a research commissioned by the 'Built Environment Industry Innovation Council' (BEIIC) suggest that adoption of BIM technology could contribute to on the expansion of the Australian economy and with time this would equate to an increase in GDP. It is suggested that:

*“Concerted government support for the use of BIM by the notoriously fragmented Buildings Network could increase usage in 2025 by 6-16% according to conservative estimates from industry representatives. This accelerated rate of BIM adoption would produce an economic benefit equivalent to \$5 billion added to Australia’s GDP... Widespread use of BIM will also increase the performance of new and renovated buildings with improvements in: material consumption; energy efficiency; carbon emissions; and the productivity of the occupants.”<sup>1</sup>*

Built Environment Industry Innovation Council of Australia (based Allen Consulting Group, 2010) suggest that BIM has the potential to improve the productivity of the Buildings Network very significantly (up to 6-9%) with an high benefit cost ratio (BCR of ten). This provides a compelling reason for BIM adoption from a government point of view. Overall, the evidence of increasing BIM awareness in Australia can be observed from the five streams of activities identified below.

1. Commissioned reports to study the BIM adoption impact to Australian Economy
2. Continuing National BIM initiatives
3. Research and Development into BIM
4. BIM training in the University and Vocational Sector
5. Professional development focused on BIM

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<sup>1</sup> Building Smart URL: <http://buildingsmart.org.au/increasing-the-productivity-of-the-buildings-network-by-adopting-building-information-modelling> Accessed 10/09/12 at 6 Pm

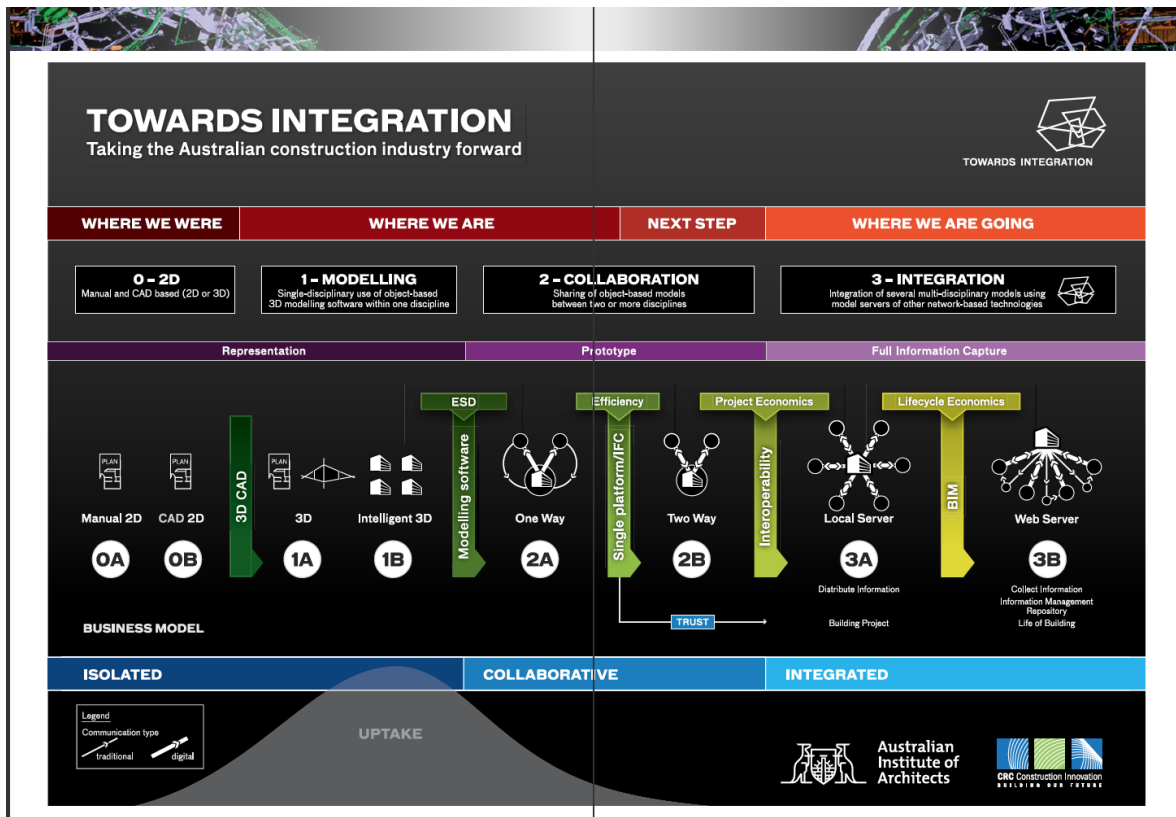


Figure 1: BIM integration map – National Guidelines for Digital Modelling CRC-CI 2009<sup>2</sup>

Figure 1 from the National guidelines for digital modeling (CRC-CI 2009) indicate that, although current BIM practices in Australia can be characterised as both isolation (used by individual firms/disciplines) and somewhat collaborative (with selected members/disciplines in the project team), the future is to strive towards full collaborating and then naturally process to integration stage (multi firm/disciplinary practices working together). This trend is reinforced by documentation and guidelines that have been published since 2009 (see Section 3 Commissioned Reports on BIM and Section 4 Continuing National BIM initiatives).

***“Within the Australian AEC sector there is an active push to move BIM away from practice-in-isolation, towards collaborative practice.”***

<sup>2</sup> CRC (2009) National guidelines for digital modelling. Brisbane: Icon.Net Pty Ltd.

## 2. Commissioned Reports on BIM: The Intent

A number of reports commissioned by both public and private initiatives provide an Australian specific understanding of BIM acceptance. Selected reports are identified below.

### 2.1 Issues Paper: Digital Modelling and the Built Environment- June 2010<sup>4</sup>

This report by the Digital Modelling and the Built Environment Working Group (which is a joint initiative of the Built Environment Industry Innovation Council-BEIIIC and the Information Technology Industry Innovation Council -ITIIC), highlighted some of the challenges in implementing BIM in. It also focused on develop identifying approaches for the developing capabilities of the ACE sector for adopting integrated digital models and technology to address new regulations, improve efficiency, address environmental and life-cycle issues and increase international competitiveness.

### 2.2 Productivity in the Building Network: Assessing the impacts of Building Information Models- October 2010<sup>5</sup>

This report heights the economic case for BIM adoption in Australia. It also provides a road map for BIM adoption in Australia. The report suggests that “it is important to keep in mind that, while BIM is a transformative, enabling technology that is very beneficial relative to its costs, it will only change a portion of a segment of a wider economy which has a value today of more than a trillion dollars. Still, achieving accelerated widespread adoption of BIM would be an important stepping-stone towards raising the overall productivity of the Australian economy”.

### 2.3 BIM in Australia: A report on BIM and IPD forums – December 2010<sup>6</sup>

This report identifies both opportunities and paths the needs to be followed for wider BIM adoption. It highlighted that BIM leadership and BIM implementation date, procumbent, approach, change management issues and Government involvement critical for BIM success. It suggests, “BIM should be part of a federal government initiative to drive the changes that are needed. the green star initiative in relation to sustainability is an example of a government involvement that drove significant changes for the ACE industry”. In addition, the report stress that “the members of organisations such as consult Australia, the Australian Institute of Architects, Engineers Australia, Australian Constructors Association, Australian

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<sup>4</sup> Built Environment Digital Modelling Working Group (2010) Issues paper: Digital modelling and the built environment for department of innovation industry, science and research Url:

<http://www.innovation.gov.au/Industry/BuildingandConstruction/BEIIC/Documents/BEDMIssuesPaper.pdf>

<sup>5</sup> Allen Consulting Group, 2010, *Productivity in the buildings network: assessing the impacts of Building Information Models*, report to the Built Environment Innovation and Industry Council, Sydney, October 2010

<sup>6</sup> Australian Institute of Architects (2010) BIM in Australia, [www.architecture.com.au/i-cms\\_file?page=14980/BIM-in-Australia](http://www.architecture.com.au/i-cms_file?page=14980/BIM-in-Australia). Accessed on 11/10/12 at 10 Pm

Institute of Quality Surveyors, Australian Institute of Building surveyors, Master Builders Australia, property council of Australia and Australian Institute of Building will have to encourage their professional bodies to work in partnership with other industry associations.”

## **2.4 National Building Information Modelling Initiative - June 2012<sup>7</sup>**

This report proposes a number of key recommendations for progressing with BIM agenda in Australia. This report has proposed that from 1 July 2016 Australian Government should procure all its buildings through full collaborative BIM based on open standards for information exchange. It also suggests that all levels of government, i.e. Commonwealth and State and Territory governments should be encouraged to introduce mandatory use of BIM for their building procurements.

## **2.5 BIM-MEPAUS Road Map 2012 Parliamentary Launch- August 2012<sup>8</sup>**

According to Air Conditioning and Mechanical Contractors’ Association (AMCA) suggest that the major challenges to the adoption is the BIM industry standards that have been *“developed by designers and software specialists without due consideration of the project delivery workflows requirements. They indicate that BIM-MEPAUS standards builds on established industry practices for the first time. The focus on interoperability within BIM in our view was holding back the industry – whilst we are looking to be Industry Foundation Classes compliant we are happy to focus on a vendor independent but vendor specific workflow...”*.<sup>4</sup>

A clear message is stemming from these reports and it is that BIM has macro economic significance, in addition to micro economic benefits, and therefore accelerated adoption of BIM is in the interest of Australia. Despite the numerous BIM adoption challenges identified in these reports, they suggest early involvement with BIM provides a good business case for ACE firms with added future advantage.

***“Both the micro and macro economic cases for BIM deployment are increasingly indicating accelerated adoption in Australia.”***

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<sup>7</sup> buildingSMART Australasia 2012, National Building Information Modelling Initiative. Vol.1, Strategy: A strategy for the focused adoption of building information modelling and related digital technologies and processes for the Australian built environment sector, report to the Department of Industry, Innovation, Science, Research and Tertiary Education, Sydney, June.

<sup>8</sup> AMCA (2012) BIM-MEP<sup>aus</sup> Road map2012 Parliamentary Launch, Burwood Victoria: Air Conditioning and Mechanical Contractors’ Association URL: <http://www.bimmepaus.com.au/latest-news-details/189-news.html>



### 3. Continuing National BIM initiatives

Numerous initiatives to implement BIM in Australia in have been carried out in a concerted manner. Bodies such as International Alliance for Interoperability (IAI) presently under the banner of 'buildingSmart', the Corporate Research Centre for Construction Innovation (CRC-CI), Air Conditioning and Mechanical Contractor's Association (AMCA), and National Specification (NATSPEC) have been continuously involved in BIM acceptance initiatives. In addition to this BIM vendors such as Revit & Graphisoft have also made efforts to support localized BIM initiatives to assist with context specific adoption.

**Table 1: Australasian based BIM Guides**

Organisation	Document
NATSPEC	National BIM Guide
ANZRS	Australian and New Zealand Revit Standards
AMCA	BIM-MEPAUS <a href="http://www.bimmepaus.com.au">www.bimmepaus.com.au</a>
CRC-CI (see Section 4)	National Guidelines for Digital Modelling

#### 3.1 IAI and buildingSmart Initiatives

The 'buildingSmart' established in 2005, that is formally known as (IAI) International Alliance for Interoperability (established in 1994) is one of the key organisations working on initiatives to improve BIM adoption in Australasia. The main goal of buildingSmart Australasia is production of better buildings through promoting appropriate adoption of technologies and processes that promise better outcomes. They are focused on driving "industry uptake of [BIM] technologies (...) implementation, and training programs, as distinct from the technical standards development work" performed under the IAI banner.<sup>9</sup>

'buildingSmart' draws its members from across the ACE industry to continue its initiative to promote BIM technologies. Their members include "building owners and developers (both government and private); Architects, Engineers, and related design, planning, and authority professionals; builders, sub-contractors, product and materials suppliers; and related service providers".<sup>8</sup>

buildingSMART also holds series of conferences and workshops in all the Australian states and territories (recent ones were conducted between 2011 and 2012), with numerous stakeholders attending to improve BIM implementation agenda. One such output from this initiative was formulation of the National BIM Initiative (NBI) Report Volume 1: Strategy.<sup>10</sup>

<sup>9</sup> Building Smart BIM initiatives <http://buildingsmart.org.au/the-national-bim-initiative>

<sup>10</sup> The National Building Information Modelling Initiative (NBI) Report published 21 August 2012, [http://buildingsmart.org.au/nbi-folder/NationalBIMInitiativeReport\\_6June2012.pdf](http://buildingsmart.org.au/nbi-folder/NationalBIMInitiativeReport_6June2012.pdf)

### 3.2 Collaborative - OPEN BIM Initiatives

BuildingSmart Australia has formed an alliance with a number of software vendors to promote the concept of Open BIM. Graphisoft indicates:

*“Open BIM represents a modern approach to interdisciplinary collaboration for all members of the AEC industry... Open BIM is a universal approach to the collaborative design, realization and operation of buildings based on open standards and workflows... The Open BIM community welcomes all software vendors, AEC practices (designers, engineers, constructors) as well as building owners, as the Open BIM logo is the guarantee for successful and streamlined collaboration on BIM projects - anywhere in the world”*<sup>11</sup>

The purposes of the Open BIM Alliance of Australia (OBAA) is to “promote and represent “Open Standard BIM and Interoperability” to Government and Industry.”<sup>12</sup> Currently buildingSMART, GRAPHISOFT, Tekla, Nemetschek Vectorworks, Inc. Nemetschek Scia, Nemetschek Allplan, Nemetschek, Data Design System are part of the Open BIM alliance.

Why is OPEN BIM approach important? (following is an extract from the Graphisoft website)<sup>11</sup>

- Open BIM supports a transparent, open workflow, allowing project members to participate regardless of the software tools they use.
- Open BIM creates a common language for widely referenced processes, allowing industry and government to procure projects with transparent commercial engagement, comparable service evaluation and assured data quality.
- Open BIM provides enduring project data for use throughout the asset life--cycle, avoiding multiple input of the same data and consequential errors.
- Small and large (platform) software vendors can participate and compete on system independent, ‘best of breed’ solutions.
- Open BIM energizes the online product supply side with more exact user demand searches and delivers the product data directly into the BIM.

***“The adoption of open-Access approaches to BIM must inevitably accelerate the adoption of collaborative working practices”*** (Refer Figure 1).

### 3.3 NATSPEC Initiatives

Another continuing initiative is the further developments to BIM Guides and BIM

<sup>11</sup> <http://www.graphisoft.com.au/openbim/>

<sup>12</sup> BuildingSmart Open BIM alliance of Australia <http://buildingsmart.org.au/open-bim-alliance-of-australia#>

Management Plans. Over the years different BIM guides are developed (Refer Table 1) and are continuing to be developed. Latest in the list is the NATSPEC BIM guide that constitutes a more refined and practice focused BIM management plan and supporting templates to primarily aid firms in the Australian construction sector. The NATSPEC BIM guide development had the corporation of a number of professional bodies including AIB, AIQS, AIBS, AIA and MBA. This guide has attempted to address some of the procedural issues highlighted in the reports. NATSPEC guidelines are flexible to accommodate to use in different procurement contexts. The guideline can be viewed to be one of the most comprehensive Australian documents, and includes explicit articulation of aspects relating to Implementation plan, BIM management plan, BIM roles and responsible, Model sharing, collaboration procedures and specific BIM services that could be part of BIM service. NATSPEC BIM guide can provide ACE sector with a sound platform to adopt BIM through 'collaborative' and 'integrative' practice.<sup>13</sup>

### **3.4 AMCA Initiative**

The Mechanical Electrical and Plumbing (Air-condition systems) body also actively promotes BIM in their constituency. BIM-MEPAUS is software/process compatible with Revit software was released in mid 2012. *"The software consists of customised Autodesk Revit MEP templates, schedules and content which are tailored to the BIM-MEPAUS standards and protocol"*.<sup>14</sup>

Despite the availability of several BIM Planning Guides and templates already in circulation, the Australian Institute of Architects (AIA) has formed a working group set out to increase awareness of the importance of BIM Management Plans in the local industry and provide practical advice on BIM adoption.

***"Ongoing Australian BIM initiatives are refining and reinforcing BIM management practices,- paving the way for accelerated BIM adoption and increased integration."***

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<sup>13</sup> NATSPEC BIM Portal: <http://bim.natspec.org/> accessed on 14/09/2012 at 4 Pm

<sup>14</sup> <http://www.acif.com.au/acif-news/bim-mepaus-industry-update>

## 4. BIM Research and Outputs in Australian Context

As part of improving BIM practices, continuous research into different aspects of BIM has been conducted by Australian Universities and research institutions. Research into BIM has been funded by a number of Australian government funding bodies including CRC-CI (Corporate Research Centre for Construction Innovation), ARC (Australian Research Council) and OLT (Office for Learning and Teaching).

### 4.1 BIM related Research Funding

In the mid to late 2000 significant level of research was conducted by the CRC-CI on aspects relating to BIM technology and practice. It produced one of the initial Australian BIM guidelines.<sup>15</sup>

Some of the CRC-CI research Projects<sup>13</sup>

- Business Drivers for BIM Business Drivers for BIM
- BIM Planning Construction Planning Workbench
- Business Drivers for BIM Business Drivers for BIM  
BIM Estimating for Civil structures

Furthermore CRC-CI projects also looked into BIM and Facilities Management (producing a digital model of the Sydney Opera house) and Australian-based adoption case studies. Both ARC and OLT have also funded a number of studies in recent years to improve the practices and productivity in the built environment.

In 2010 the OLT funded a project titled 'Collaborative building design education using building information modelling'. The aim of the project is *"to address the need for [BIM skilled] graduates through the development of a transferable curriculum that can be used by all Australian universities that offer architecture, engineering or construction degrees."*

*This project is based on the fact that "the construction industry worldwide is moving towards collaborative design practices for the majority of projects, but the AEC education sector is falling behind in this respect. The use of building information modelling (BIM) is widely recognised as having the potential to change the way building projects are run by facilitating collaborative working practices that engage all design team members at an earlier stage in the design process, aided by BIM tools. Graduates with collaborative design skills and BIM expertise will be in high demand and will also have a profound effect on the AEC sector, leading industry change by developing innovative and collaborative working practices using BIM."*<sup>16</sup>

<sup>15</sup> RMIT School of Property and Construction Management <http://www.rmit.edu.au/propertyconstruction/ict> accessed on 17/10/12 at 6 Pm

<sup>16</sup> OLT website <http://www.olt.gov.au/project-collaborative-building-design-education-using-building-information-modelling-2010> Accessed on 18/10/12 at 1 PM

## 4.2 BIM Related Publications arising from research projects

### Adopting BIM for facilities Management Sydney Opera House<sup>17</sup>

*“The digital modelling research stream of the Sydney Opera House FM Exemplar Project ... demonstrated the significant benefits in digitising design documentation and operational and maintenance manuals. Since Sydney Opera House did not have digital models of its structure, there was an opportunity to investigate the application of digital modelling using standardised Building Information Models (BIM) to support facilities management (FM).”*

### National Guidelines for Digital Modelling: Case Studies<sup>18</sup>

This document provides illustration of six case studies from building varying in nature that deployed BIM. The firms involved with the case studies benefited from the knowledge generated from this research.

### National Guidelines for Digital Modelling<sup>19</sup>

*“The purpose of these guidelines is to assist in and promote the adoption of BIM technologies in the Australian building and construction industry, and try to avoid the uncertainty and disparate approaches that created inefficiencies with the implementation of 2D CAD over the past three decades.”* This is one of the initial Australian Guideline for Digital Modelling practices. It illustrates the processes for progressing from ‘Isolated’ BIM practice to ‘integrated’ BIM practice (Refer Figure 1).

### Ongoing Publications in Journals and conferences

Australian academics and practitioners regularly publish BIM related articles in Journals, Industry magazines and conferences. These papers can be in the form of case studies of BIM adoption, technological development, challenges faced with BIM adoption etc.

***“Any organisation or firm choosing to be involved in collaborative BIM research and development, whether it be technological and process-oriented, will have the opportunity to learn for themselves.”***

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<sup>17</sup> CRC (2007) Adopting BIM for facilities management: Solutions for managing the Sydney opera house. Brisbane: Icon.Net Pty Ltd.

<sup>18</sup> CRC (2009) National building for digital modelling: Case studies. Brisbane: Icon. Net Pty Ltd.

<sup>19</sup> CRC (2009) National guidelines for digital modelling. Brisbane: Icon.Net Pty Ltd.

## 5. BIM Education/Training and Professional Practice

### 5.1 BIM Education and Training in Australia

Shortage of BIM skills is seen as a key barrier to BIM adoption. Therefore, a strong push for BIM education in the Universities and in the vocational sector is evident in the BIM agenda<sup>20</sup>. The 'buildingSMART' national BIM initiative identifies educating building professionals, in the form of new multi-disciplinary approaches, as a key priority. However, a number of universities have introduced BIM context into programs (see Appendix 1).

### 5.2 BIM focused Professional Development

Most of the professional bodies associated to ACE sector are actively involved in promoting the BIM agenda and are offering professional development activities for its members on BIM. A number of Australian professional bodies participated in the development of the Natspec BIM Management Plan.

The **Australian Institute of Architects** together with Consult Australia have launched a BIM website to disseminate BIM documents. One of the aims of this initiative is to outreach to the sector explaining in simple language, how BIM could benefit their business. They educate professionals on costs and hurdles when implementing a BIM methodology.<sup>21</sup>

The **Australian Institute of Building (AIB)** is also actively involved in developing awareness among its members about BIM developments. AIB is offering a number of BIM development programs to train their members. In 2011, the South Australian Chapter presented a seminar on Building Information Modelling (BIM) relating to on-site application (focusing on clash detection tool).<sup>22</sup> In 2012 AIB members were offered a Solid Support program, a tailored 45-minute webinar, providing an overview on the latest developments on BIM and 4D agenda.

The **Australian Institute of Quantity Surveyors** offered the opportunity to showcase BIM projects for firms to display their excellence in innovation and collaboration to their peers, colleagues and clients by launching the AIQS North Queensland inaugural BIM AWARDS 2012, sponsored by GraphiSoft.<sup>23</sup>

The **Facilities Management Association** also organises professional development activities such as breakfast seminars and training on BIM. FM link highlights to new BIM

<sup>20</sup> Giangregorio, R D and Goss, M (2008) Emerging building information modeling/management technologies used in the building design industry, Victoria: International Specialised Skills Institute.

<sup>21</sup> Australian Institute of Architects <http://www.bim.architecture.com.au/groups/index.html> accessed on 10/10/12 at 7 Pm

<sup>22</sup> <http://www.aib.org.au/scripts/cgiip.exe/WService=AIB/ccms.r>

<sup>23</sup> <http://www.bimawards.com.au/>

products on its website. In July 2012 the cloud-based FM system which integrates FM and BIM was introduced in their website. The “*cloud-based system integrated with BIM data that helps architects, engineers and contractors share building information with owners and operators throughout the lifecycle of the building. The system is designed to allow AEC firms help building owners and managers streamline project handover and drive down lifecycle costs.*”

***“Professional development activities offered by the Australian professional bodies are increasingly focused on BIM”***

### **5.3 Job Market for BIM and BIM experts**

One of the indicators of BIM adoption in Australia is the “*evolving job description for BIM professionals*”<sup>24</sup> and increasing the employment opportunities for BIM experts. Leading online job seeking portal Seek.com.au currently (as at Friday, September 7, 2012) has 32 job vacancies for full-time permanent BIM specialists spread over six states). The number of vacancies as follows<sup>25</sup>:

- 1 – South Australia
- 1 - ACT
- 4 – Queensland
- 6 – Western Australia
- 9 – Victoria
- 13 – New South Wales

Salaries range from \$80,000 to work for a small private architectural firm in Sydney to \$130,000 (+ super) to work for a larger architectural firm in Melbourne. The companies seeking to employ BIM specialists including firms that engage in general building construction, design and construction procurement, drafting services, engineering services, project portal service providers etc.

The reports into BIM adoption has constantly indicated shortage of BIM skills is a key challenge for BIM adoption Moreover, the limited but increasing pool of BIM knowledge can offer opportunities but will create commotion in employing and retaining top BIM skill personal. Presently BIM experts are activity working with buildingSmart and with other organisations to promote BIM integration (See Appendix ii)

***“The firms that attract the right BIM skills, or partner with firms that can offer BIM skills, are likely to gain competitive advantage “***

<sup>24</sup> <http://www.bimmanager.com/bim-manager-job-description/>

<sup>25</sup> The search was restricted to jobs that specify BIM in the job title and does not include the wider category of job vacancies that omits “BIM” from the job title, but includes “BIM” in the job description, e.g. job title “REVIT Modeller”.

## 6. BIM enabled Firms and Projects

The following examples of current and recent construction projects across Australia reveal that BIM adoption is becoming widespread across the AEC sector. Ranging from huge mining projects in the Pilbara of WA and in South Australia to private nursing homes in Queensland, a full BIM approach is quoted by the architects and constructions firms involved as being essential to facilitate the entire process from design through to management and maintenance of property assets.

### 6.1 BIM adoption in Victoria- Australia

#### **Echuca Regional Hospital Project – Installation of Solar Heat Absorption Chiller Package**<sup>26</sup>

Engineers: WSP Lincolne Scott

Project Cost: \$2,191,000

WSP Lincolne Scott, and Engineering firm, used BIM to model the solar field and absorption chiller plant for Australia's largest solar thermal cooling system, which opened at Echuca Hospital in April 2011 (in regional Victoria). BIM was used for preparing installation models, which enable easily approach, the layouts, quantities and costs.

Marthinus Noyce, associate director of WSP Lincolne Scott suggested that, “ BIM also provided an easy-to-use visual model, which everyone could interrogate from every angle, understand and support ... A conventional set of drawings and details would not have been as easy to understand, and would probably have required several explanation sessions, especially to nontechnical people. BIM also allowed us to have an accurate, relatively inexpensive, 3D model printed – which had significant value in allowing all parties to better visualise the final installation.”<sup>17</sup>

In essence BIM in this project enabled eliminating of errors arising out of uncoordinated errors associated with (changes to) multiple drawings and tables.

#### **Eureka Tower- Melbourne**<sup>27</sup>

The design of the Eureka Tower in Melbourne, Australia was accomplished using Graphisoft's ArchiCAD. At 92 stories and nearly 1,000 feet in overall height, the Eureka Tower is the tallest residential structure in the world. Designed by Fender Katsalidis

<sup>26</sup> [http://www.airah.org.au/imis15\\_prod/Content\\_Files/EcoLibrium/2011/July2011/2011-07-F01.pdf](http://www.airah.org.au/imis15_prod/Content_Files/EcoLibrium/2011/July2011/2011-07-F01.pdf)

[http://www.sustainability.vic.gov.au/resources/documents/PRO092\\_Renewable\\_Energy\\_Echuca\\_Hospital\\_factsheet.pdf](http://www.sustainability.vic.gov.au/resources/documents/PRO092_Renewable_Energy_Echuca_Hospital_factsheet.pdf)

<sup>27</sup> <http://fkaustralia.com/>



Architects, the Eureka Tower project is a great example of an architectural firm that has fully embraced the process change associated with a full BIM approach. (Full details are available on the Graphisoft website).

Construction cost: \$500 million

Completed: October 2006

### **'Little Hero' – Melbourne - residential/retail building CBD**<sup>28</sup>

Designed by Fender Katsalidis this 8 storey urban living development was built from pre-fabricated modules supplied by Unitised Building (UB)

### **Web Dock Bridge- Melbourne CBD**<sup>29</sup>

Pedestrian bridge over the Yarra River used digitised construction design by Australian firm, Cocciardi Pty. Ltd. The bridge was fully modelled and extensive automation was used in the fabrication of many components.

### **Melbourne Tullamarine Airport Terminal 2 – expansion**<sup>30</sup>

Architects: Architectus

Completed 2011: Major Public Profile project: \$330 million comprising over 41 000 m<sup>2</sup> of new space and 8000 m<sup>2</sup> of refurbished area provides five new international gates, a new outbound passenger processing area, extensive new baggage conveying and sorting systems and a world-class retail precinct.

## **6.2 BIM adoption in NSW- Australia**

### **Health Infrastructure NSW (extracts from Robert Rust presentation)**<sup>31</sup>

Health Infrastructure (HI) NSW is developing a strategy to implement BIM on major projects. As client HI will advocate for BIM adoption and ensure the client requirements/expectations accommodate current industry capacity. In essence HI encourages the use of BIM processes in projects within a controlled and consistent delivery framework. HI NSW is defining Project BIM requirements to ensure consistency and best practice in project delivery. HI will be mandating BIM deliverables on projects to ensure the quality of project outputs and a whole-of-life-cycle approach. The implementation will be gradual over a period of time and may involve pilot projects before being applied universally. HI has an expectation that

<sup>28</sup> [http://www.bca.gov.sg/publications/BuildSmart/others/buildsmart\\_10issue2.pdf](http://www.bca.gov.sg/publications/BuildSmart/others/buildsmart_10issue2.pdf) *Build Smart*, Issue 2, 2010, p.7 and [Http://www. Unitisedbuilding.com](http://www.unitisedbuilding.com).

<sup>29</sup> <http://www.cocciardi.com.au/folio/web-dock-bridge/>

<sup>30</sup> <http://www.architectus.com.au/projects/melbourne-airport-t2-expansion-0>

<sup>31</sup> Digital Hospital Design presentation by Robert Rust, Chief Executive Health Infrastructure 30th July 2012 , [http://c.ymcdn.com/sites/www.hisa.org.au/resource/resmgr/hic2012/RobertRust\\_1330.pdf](http://c.ymcdn.com/sites/www.hisa.org.au/resource/resmgr/hic2012/RobertRust_1330.pdf)

3D visualisation will be available for the pre-planning and planning processes, particularly to support 'marketing' of the project and community consultation. Industry must develop a capacity to successfully incorporate BIM processes into facility development. Designing and constructing new facilities within a BIM environment is an enabler for the successful delivery of digital hospitals for 2022.

### **Blacktown & Mount Druitt Hospital**<sup>32</sup>

Located in Western Sydney is undergoing a major upgrade with a project cost of \$300million. The project is discussed and illustrated in the abovementioned (HI) NSW report as an example of how BIM adoption is essential to the design of new facilities.

### **Sydney Opera House**<sup>34</sup>

Bentley Architecture and Bentley Structures are being used to capture existing conditions and facilitate the refurbishment and acoustical retrofit of the world renowned Sydney Opera House.

### **Coca-Cola Place (previously known as ARK) Sydney**

Architects: Rice Daubney, built by Thiess.

"Completed in 2010, it was conceived, designed, documented and built using Building Information Modelling (BIM). Creating a 3D building model has on-going applications for the management and maintenance of property assets. All of Ark's intellectual property built within the Building Information Model can now be used as a centralised source to manage and maximise building performance now and into the future."<sup>35</sup>

### **No.1 Bligh Street, Sydney – office block CBD**<sup>36</sup>

Architects: Architectus

Completed 2012: 1 Bligh Street, Sydney, Australia's first 6 Star Green Star high-rise office.

### **Parramatta Square Precinct – office block**<sup>37</sup>

Architects: Architectus

Paramatta City Council has selected Architectus' BIM enabled design for a new commercial building (13 storey A-Grade office block) for the revitalised Parramatta Square precinct.

<sup>32</sup> *Progress on \$300M Blacktown Mt Druitt Redevelopment*, 21 August 2012, [http://www.health.nsw.gov.au/news/2012/20120821\\_00.html](http://www.health.nsw.gov.au/news/2012/20120821_00.html)

<sup>34</sup> <http://www.bentley.com/en-AU/Promo/High+Performance+Building+Design/BIM+Overview.htm>, see also on this page, Stuart Bull (ARUP) video on the Opera House project.

<sup>35</sup> <http://www.archdaily.com/139868/australia's-1st-completed-building-information-modelling-bim-high-rise-wins-more-awards/>

<sup>36</sup> <http://www.architectus.com.au/projects/1-bligh-street-sydney>

<sup>37</sup> <http://www.architectus.com.au/projects/111-george-street-parramatta-planning-approval>

## 6.3 BIM adoption – in South Australia

### **Razorback Magnetite Project (Mining)**<sup>38</sup>

Client: Royal Resources

BIM consultants working on this project are PDC.<sup>39</sup>

BIM is being fully utilized for every aspect of this project at a very large magnetite deposit located 240km NNE of Adelaide, South Australia. Example, shop detailing and 3D BIM modelling of structural steelwork and mechanical plate work for the Process Plant.

### **Marion, SA Aquatic & Leisure Centre - SAALC**

Construction by Candetti Constructions Pty Ltd begun October 2009 - Completed April 2011.<sup>40</sup>

“The \$80 million State Aquatic Centre, located at Marion, is now Australia’s premier aquatic and leisure facility located in South Australia. This new facility features a 50-metre main competition pool, and a diving and water polo pool built to meet the international standards of the world aquatics governing body, FINA.”<sup>41</sup>

### **Adelaide Oval Upgrade**<sup>42</sup>

Client: Government of SA, Project cost: \$450 million  
Mott Macdonald builders

“We’re using building information modelling (BIM) on the Adelaide Oval Upgrade project to save time on architectural design.”

### **Flinders Centre for Innovation in Cancer (Flinders University)**<sup>43</sup>

“Woodhead Group BIM Development Coordinator, **Gianni Zandel**, presented a case study of the new incorporating the Livestrong Cancer Research Centre, as an example of the successful integration of the project documentation model and the leadership role applied to this project.”

## 6.4 BIM adoption – in Western Australia

### **Hope Downs 4 Mine Project – East Pilbara, WA**<sup>44</sup>

<sup>38</sup> <http://www.royalresources.com.au/razorback.asp>

<sup>39</sup> <http://www.pdcgroup.com/projects/category/bim-consultancy>

<sup>40</sup> [http://www.infrastructure.sa.gov.au/completed\\_projects/sac](http://www.infrastructure.sa.gov.au/completed_projects/sac)

<sup>41</sup> Project brochure: [http://www.infrastructure.sa.gov.au/data/assets/pdf\\_file/0018/53424/int173.PDF](http://www.infrastructure.sa.gov.au/data/assets/pdf_file/0018/53424/int173.PDF)

<sup>42</sup> <http://www.mottmac.com.au/bimadelaideoval/>

<sup>43</sup> <http://www.woodhead.com.au/news/woodhead-present-at-the-property-council-of-australia-sa-bim-forum/>

Client: Kellogg Brown & Root Pty Ltd

BIM consultants: PDCgroup Engineering Design, Detailing and 3D Building Information Modelling.

Project involves the development and operation of an above and below the water table greenfields iron ore mine and associated infrastructure.<sup>45</sup>

### **Fiona Stanley Hospital – Perth, WA**<sup>46</sup>

\$2 billion, 1000 bed, green star hospital built by IEAG

BG & E (Engineering) Perth did the Façade.<sup>47</sup>

Architects: Hames Sharely

## **6.5 BIM adoption – in Queensland**

### **Fraser Coast Cultural Centre – Tourism**<sup>48</sup>

The Cultural Centre will house the new Fraser Coast Discovery Centre and the Hervey Bay Regional Gallery. Consultants GHD developed the Revit Structural model and issued it to Roxborough Consulting for the purpose of further model development and Steel Detailing. “The owner, upon advice from GHD, agreed to the early engagement of JR to enable the advanced delivery of Shop Detail drawings, by adopting IPD methods to shorten the lead time on the structural steel.”<sup>49</sup>

### **Cairns Cruise Liner Terminal**<sup>50</sup>

Client: Cairns Port Authority

Project: \$10 million

Architects: Arkhefield (Brisbane)

A case of retro-BIM where an existing building is re-developed using BIM.

### **River Quay, South Brisbane (restaurant precinct)**

Construction Value: \$12,000,000

Architect: Arkhefield

Builder: ADCO Constructions

Information: Norman Disney & Young (Consulting Engineers)<sup>51</sup>

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<sup>44</sup> <http://www.pdcgroup.com/projects/category/bim-consultancy>

<sup>45</sup> [http://www.riotintoironore.com/documents/HD4\\_Public\\_Environmental\\_Review\\_Parts\\_1\\_-\\_4.pdf](http://www.riotintoironore.com/documents/HD4_Public_Environmental_Review_Parts_1_-_4.pdf), see page 33 ff.

<sup>46</sup> [http://www.fionastanley.health.wa.gov.au/docs/facts/designing\\_new\\_hospital.pdf](http://www.fionastanley.health.wa.gov.au/docs/facts/designing_new_hospital.pdf)

<sup>47</sup> <http://www.bgeeng.com/bim>

<sup>48</sup> Case study presented at a conference in Wollongong

Conference website <http://www.revitconference.com.au/rtc2012au/index.htm>

<sup>49</sup> <http://jrdetailers.com.au/bimblog/?p=105>

<sup>50</sup> <http://www.australiandesignreview.com/news/2361-cairns-cruise-terminal-wins-heritage-awards>

<sup>51</sup> <http://www.ndy.com/projects/river-quay-south-brisbane>

### **Eastern Busway section and Bus station**

This A\$465.8 million project will deliver a new 1.05 km busway from the South East Busway at Buranda to Main Avenue, Coorparoo. Funding to acquire properties to Cavendish Road, Coorparoo is also included in this stage of the project.<sup>52</sup> TEKLA – employing fabrication data imported directly from the model.<sup>53</sup>

### **Archbishop Duhig Nursing Home Redevelopment, Holland Park (Brisbane)**<sup>54</sup>

Good example of a small sized project using BIM. ABM Architects designed the computer model for new aged care building. Work in progress and scheduled completion is in 2013.

## **7. Future initiatives relating to BIM in Australia**

The report on 'Productivity in the Building Network', released in 2010, suggest that to accelerate BIM uptake in Australia a national strategy for BIM implementation including plans, targets and guidelines should be produced. To this effect 'buildingSMART' related the National BIM Strategy in mid 2012. buildingSMART suggests that the industry and

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<sup>52</sup> <http://www.tmr.qld.gov.au/Projects/Name/B/Busways.aspx>

<sup>53</sup> <http://www.tekla.com/international/solutions/building-construction/Documents/Tekla-global-BIM-awards-2011/bim-Eastern-Busway.html>

<sup>54</sup> <http://www.abm.net.au/>

government should work together to address the six key targets identified in the National BIM Initiative. They are:

- (a) Procurement (new collaborative contracts and how to manage risk)
- (b) BIM Guidelines (clear standards for Australian BIM users)
- (c) Education (a new multi-disciplinary approach to educating building professionals is required)
- (d) Product Data and BIM Libraries (the building supply chain needs to get involved and start digitising their components for inclusion in intelligent building models)
- (e) Process and Data Exchange (there are insufficient accepted universal standards in place for exchange of BIM data for collaboration)
- (f) Regulatory Framework (planners, local government and other regulatory bodies need guidance on assessing and approving BIM-based projects)

The report on 'Productivity in the Building Network' also suggests that using BIM in the procurement of Commonwealth, state governments and other public bodies could help accelerate BIM adoption. This would give the additional benefit of increasing their performance in use and the return on investment. The current focus is on developing BIM technology and process to support BIM based government procurement at all levels of government.

The above message is also reinforced in the 'National Building Information Modelling Initiative, Strategy document'. It also suggests a specific timeline, that is by July 2016, for adoption of an open standard based 3D collaborative BIM information exchange for all Australian Government building procurement. This report also supports the initiatives proposed in the 'Productivity in the Building Network' report to focus on developing Procurement approaches, BIM Guidelines, Education stream, Product Data and BIM Libraries, Process and Data Exchange approaches, Regulatory Framework and Pilot Projects.

BIM-MEPAUS ROAD MAP2012 report suggests that the most logical path ahead to move the industry forward with BIM adoption include

- (a) Expedite the level of leadership and coordination across the supply chain
- (b) Industry skills, training and education development agenda and
- (c) Re-affirmed enthusiasm for Software compatibility development.

## **8. BIM adoption in Australia: Concluding Remarks**

This report was commissioned to reveal the extent of BIM penetration into the Australian AEC sector, with the intention of signposting future activities for the Tasmanian AEC sector in general, and the TBCITB in particular. It has demonstrated that whilst BIM usage

is not currently widespread all the indications are that the industry is gearing up for its adoption, extending well beyond the domain of demonstration projects only.

Education and training is being rapidly developed to scaffold the adoption of BIM at all levels from architectural technician upwards, with the recognition that new BIM-specific job descriptions are being created: BIM modeller, and BIM model manager are two specific examples. Professional organisations, TAFEs and universities are all rapidly responding to the challenges that BIM poses for traditional job roles.

BIM-specific advocacy groups are actively driving the development of standards and protocols for the generation and exchange of building information, thereby removing many of the traditional obstacles to BIM adoption. Whereas in the past these issues were seen as "someone else's problem" and "things that may get solved some time in the future" are now being purposefully overcome through widespread collaboration between practitioners, developers and researchers.

The inevitable consequence of these problems solutions will be the creation of sustainable competitive advantage by pioneering innovators and early adopters, who will shape the way in which buildings, and particularly major projects, are designed, procured, delivered and operated into the future. BIM is not an end in itself, rather it is a tool in much the same way as the World Wide Web, and the methods of exploiting its potential will be just as wide and varied, depending on the ingenuity of those who embrace its potential.

This report is an objective review of the current state of art in relation to BIM in the Australian AEC sector. Whilst undoubted issues still remain to be overcome it is becoming evident that widespread BIM adoption is inevitable, though the precise extent to which engagement with building information models will trickle down supply chain remains to be seen – there are signs that this may be further down than most people expect. The clear message is that to be forewarned is to be forearmed – so long as active preparation is undertaken.

## 9. Appendices

### 9.1 Appendix 1 - BIM training in Australia's Tertiary Education sector

A number of Australian universities are leading the way in BIM education, including University of New South Wales and The University of Technology, Sydney, offering undergraduate and postgraduate programs in BIM.

#### UNSW: Faculty of Built Environment, Architecture

Relevant Undergraduate Courses:

- Computer Aided Design - BENV1242
- Building Information Modelling - BENV2425
- Advanced Techniques using BIM - BENV2421

Postgraduate level UNSW offers:

- BENV7148 Advanced Techniques Using BIM

#### UTS: Design, Architecture and Building

Undergraduate core courses:

- Digital Design and Construction 1 (introduction to BIM) - 16212
- Digital Design and Construction - 216470

The construction related BIM courses “examines the practical application of Building Information Modelling (BIM) technologies and processes for the development and delivery of construction projects.”

- a) Information requirements for design and construction modelling
- b) BIM and the role/activities of the Project Team, Project Manager and BIM Manager
- c) BIM for construction scheduling, simulation and animation
- d) Contractor and client requirements for construction simulation and animation
- e) Communication of and resolution scheduling problems
- f) Visualisation of realistic construction animation
- g) Challenges and Opportunities in construction scheduling and animation

#### UTS then have a further nine undergraduate courses which include BIM training:

- Digital Built Environment - 16137
- Cost Management 1: Measurement (also CM2 & CM3) - 16105
- Time and Quality Management - 16913
- Cost Management 4: Advanced Estimating - 16412
- Procurement and Contract Management - 16423
- Design Team Management - 16263
- Advanced Valuation - 16335



UTS Postgraduate courses:

- Architectural Design: Computational Environments - 11516
- Architectural Communications: Advanced Modelling Software - 11316

RMIT: Royal Melbourne Institute of Technology

“RMIT University has launched the first Building Information Modelling studio in an academic setting within Australia capable of applied research and project collaboration with external partners.” (10 September, 2010)<sup>55</sup>

RMIT TAFE: offer short courses to anyone interested on Revit for a fee.

QUT: Queensland University of Technology

Handbook to undergraduate courses indicate BIM introduction in the course BEB210 Introduction to Collaboration. “This unit introduces students to the foundational aspects of collaboration within the design and documentation of artefacts, using Building Information Modelling (BIM) approach. Focusing on multidisciplinary collaboration during the complete life cycle of a built environment facility. This unit is an approach to the theory and practice of BIM software, exploring the translation from Computer Aided Design (CAD) to BIM. This unit is also the foundation for BEB212 Advanced Collaboration.”

UniSA: University of South Australia

UniSA offer one Undergraduate course with BIM training:

- Architectural Practice Management (ARCH 5034)<sup>56</sup>

Postgraduate courses:

- Managing Resources BIM (INFS 5076)<sup>57</sup>
- Civil Engineering Practice (CIVE 2009)<sup>58</sup>

The University of Newcastle:

The University of Newcastle is in the process of introducing BIM to a Construction Management degree. UniNewcastle, NSW offers an undergraduate course called “Communication in the Built Environment” with intensive BIM instruction as part of their degree program for:

- Bachelor in Design (Architecture)
- Bachelor of Construction Management (Building)
- B Teach/B Design & Technology.

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<sup>55</sup> RMIT University BIM Studio <http://www.rmit.edu.au/browse/RMIT%20News%2FNews%2FDesign%2Fby%20title%2FB%2FID=cv6p4hywtsh21;STATUS=A> Accessed 17/09/2012 at 6.40 pm

<sup>56</sup> UniSA BIM courses: <http://programs.unisa.edu.au/public/pcms/course.aspx?pageid=101541> Accessed 17/09/2012 at 5.25 pm

<sup>57</sup> UniSA BIM courses: <http://programs.unisa.edu.au/public/pcms/course.aspx?pageid=101663> Accessed 17/09/2012 at 5.30 pm

<sup>58</sup> UniSA BIM courses <http://programs.unisa.edu.au/public/pcms/course.aspx?pageid=101803> Accessed 17/09/2012 at 5.35 pm

### TAFE & Training Boards

TAFE NSW (4 colleges including Wollongong) offer a course with BIM component called “Advanced Diploma of Sustainable Building Design”

- Sydney Institute: offer short course “Revit - Introduction for Architects”
- Western Sydney Institute: “REVIT 3D Architectural Modelling” 1 day course only
- TAFE South Australia: “Revit Architecture Essentials” ( 9 weeks x 3 hr classes)

South Australia: Construction Industry Training Board (CITB)<sup>59</sup>

- The South Australian (CITB) have introduced a 2 day only BIM training course called “Introduction to BIM”<sup>60</sup>This CITB course is assisted by industry partners:

SurePoint and KarelCAD assist the CITB in BIM education

Among the software firms offering BIM training courses are:

- BIM-MEP with TSI (Technical Sales International) Australia have set up a 2 day BIM training course (Melbourne).<sup>61</sup>
- AEC Systems Pty Ltd (Sydney based)<sup>62</sup>  
They offer training in Autodesk BIM related tools (Revit, Navisworks, AutoCad):  
“AEC Systems as an Autodesk Authorised Training Center is proud to be able to provide a wide variety of Autocad and Revit training courses for the Architectural, Engineering, Civil, Manufacturing and related industries. Autocad courses, Autodesk and Revit training are available on a regular basis at our dedicated training facilities: Sydney, Melbourne, Perth, Brisbane and Auckland. AEC Systems also arrange on-site and customised training Autocad and Revit training.”

<sup>59</sup> <http://www.citb.org.au/D2C/Projects/tabid/188/Default.aspx>

<sup>60</sup> <http://www.citb.org.au/Employer/WorkPlacementRegistration/tabid/272/Default.aspx>

<sup>61</sup> [http://www.bimmepaus.com.au/training-and-education\\_page.html](http://www.bimmepaus.com.au/training-and-education_page.html)

<sup>62</sup> <http://www.aecsystems.com.au/>

## 9.2 Appendix 2: selection of BIM positions in the Australasian AEC Sector<sup>63</sup>

### VICTORIA:

- Daniel Jurgens  
National BIM Manager at Cox Architecture & Design  
<http://www.coxarchitecture.com.au/>
- Nicholas Broadbent  
BIM manager at Cox Architecture & Design  
<http://www.coxarchitecture.com.au/>
- Belinda Hodkinson  
BIM Development Manager at Sinclair Knight Merz (SKM)  
Author: Australian and New Zealand Revit Standards (ANZRS)  
<http://www.skmconsulting.com/>
- Paul Buckley,  
BIM Manager at NH Architecture
- Bilal Succar  
Change Agents AEC and Chair of the AIA /Consult Australia's BIM Education Working Group <http://www.BIMexcellence.net/>
- John Legge-Wilkinson  
CAD Leader - Building Structures at Arup

### NEW SOUTH WALES:

- Jim Plume  
Senior Lecturer, Information Modelling and Design, Faculty of the Built Environment, University of New South Wales
- John Mitchell, Principal, CQR Pty Ltd  
Associate Professor, Faculty of the Built Environment, University of NSW
- Jorge Pautasso  
BIM Integration Manager & Structures Service Line Leader at GHD
- Paul Hellowell  
BIM Global Technical Leader at GHD

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<sup>63</sup> Identified from publicly available sources

- Tasos Katopodis  
GHD (Newcastle)
- Jason Howden  
Group BIM Manager at Woodhead
- Anthony Habashy  
Global BIM Manager at HBO+EMTB
- Ryan Hanlen, Senior Technical Consultant at BIM Consulting & BIM Lecturer at University of Technology, Sydney.
- Autodesk facilitator  
AEC Systems Pty Ltd (Sydney based)  
<http://www.aecsystems.com.au/>

**QUEENSLAND:**

- ARUP, Peter Scuderi  
Lead Operational Performance Improvement, Management Consulting at Arup  
Secretary buildingSMART Australasia
- Paul Nunn  
Senior BIM Specialist - Construction at CSI Global Services Laing O'rourke
- Andrew Miller  
Innovation Manager at Thiess
- Mitchell Brandtman  
Quantity Surveyors & Construction Cost Managers
- Karl de Wet  
Director, Draftech Developments  
MEP&F Design, Shop Detailing, Building Services Co-ordination Management
- Chris (Mr Spot)  
Price, Co-Founder | BIM Consultant | Product Designer at Xrev, Brisbane  
<http://www.xrev.com.au/>

**WESTERN AUSTRALIA:**

- SurePoint Australasia Pty Ltd  
Offices in Brisbane, Sydney, Perth

**ACT:**

- Michael Dunn  
BIM Manager at Eric Martin & Associates
- Mitchell Punch - BIM Manager  
Team Leader at GHD

**TASMANIA:**

- Wayne Eastley (Editor)  
Committee Member, buildingSMART Australasia  
Director, bimSCOPE Pty Ltd

**NEW ZEALAND:**

- Michelle Leonard  
BIM Specialist & Associate at Jasmax New Zealand Program Manager at Revit  
Technology Conference Committee - Architecture & Planning
- Marcel van Oosterom  
Project Manager BIM Consulting Services at CSI Global Services Pty Ltd, New  
Zealand - Architecture & Planning
- Damien Legrand  
BIM Business Development Specialist at BIM Solutions centre - New Zealand -  
Information Technology and Services
- Tim West  
BIM Specialist at Mainzeal Property & Construction Ltd

