Securing and enabling access to knowledge for the future: archiving digital architectural records

Presented by Chris Burns, School of Art Architecture and Design, University of South Australia, as part of *Born Digital: A Symposium exploring digital architectural and built environment records*, on 18 April 2016.

SLIDE 1 - Intro

I'm here to talk about our project "Securing and enabling access to knowledge for the future: archiving digital architectural records." I was the Research Assistant assigned to this project.

We selected two case studies for this project and I'll talk about each one in turn.

SLIDE 2 – Ridgway Elevation – courtesy Woods Bagot

First was the Ridgway apartment building in Charlick Circuit, Adelaide, just off Rundle Mall, formed the first stage of the Garden East Renaissance Project. This was a major residential redevelopment revitalising a derelict precinct which was the original home of Adelaide's East End markets. Ridgway was designed by Adelaide-based Woods Bagot architects and completed in 1995.

SLIDE 3 – Storey Hall Interior – photograph by Chris Burns 2015

Our second case study was RMIT Storey Hall in Swanston Street, Melbourne. Storey Hall is an award-winning renovation and extension of a heritage-protected building for RMIT University. It was designed by Melbourne based firm Ashton Raggatt McDougall (ARM Architecture) in 1995. This slide shows the interior of the auditorium of Storey Hall.

SLIDE 4 – Nine-track magnetic data tapes at Woods Bagot (Adelaide office) – photograph by Chris Burns 2015

So – Ridgway: we chose Ridgway because it was one of the earliest projects at Woods Bagot to be archived on CD-ROM. Woods Bagot began using writable CDs for archiving their born-digital records in 1996.

Previously digital files were archived on magnetic tape, and there are a number of these tapes still floating around the Woods Bagot Adelaide office – here are a few of them. These are 9-track open reel tapes. As a point of interest, X4078 there contains records from the State Bank building, now Westpac House.

Unfortunately the tape reading hardware that is required to access the contents of these tapes no longer exists within the office. For the purposes of this pilot study it made sense to select a project for which the digital files were easily accessible with hardware that was freely available.

All of the born-digital files for Ridgway that formed the basis of this case study were given to me on a CD that I could take away with me – one of the advantages of digital records.

First I had a look through the hardcopy (paper-based) archive for Ridgway.

The most interesting aspect of the hardcopy records was the way in which analogue electronic technology (in particular photocopiers) had already changed the nature of architectural records since the mid-20th Century – which is the era that I was most familiar with before beginning this project. The ease with which drawings could be copied, reduced, remixed.

I found drawings that had started out as a plotted output from a CAD file. They had then been annotated, scaled by photocopier, annotated again, corrected with whiteout, and annotated again over the top of that. There were also faxes of faxes with hand written notes and so forth.

So – lots of layers.

It was very easy to look at a document and see the order in which the various iterations of operations had been carried out.

The digital archive from Ridgway was comprised mainly of Microsoft Word documents, Microsoft Excel spreadsheets and CAD drawings created using a 2D drafting package named MicroGDS.

I found quite a lot of fax cover pages in Word document format, but the attachments that were present in the hardcopy archive were of course missing in the digital archive. A lot of the information that was passing through the office at that time was not captured in the digital archive because it was not generated or transmitted in digital form.

MicroGDS software was used to generate CAD drawings on the Ridgway project. At that time CAD was used exclusively for the generation of 2D drawings. CAD software was used to

generate presentation floor plans and some title blocks for manual renderings, while sections, elevations and details were all drafted manually – in some cases freehand.

SLIDE 5 – Ridgway Site Plan – courtesy Woods Bagot

This is the site plan for Ridgway from a set of presentations drawings that went to ACC for approval. This is probably the most sophisticated CAD drawing from Ridgway.

Woods Bagot retains an active licence for MicroGDS meaning that the original CAD files could be opened. However, in order to do so, the files needed to be updated to the latest version of the software – in this case from version 4 to version 5.1. This is an irreversible batch-processing operation with permanently alters the digital files. Original metadata – including original dates created, modified, and accessed are lost. We of course used copies when it came time to attempt opening the Ridgway CAD files.

Without access to the original proprietary software, the CAD files for Ridgway would not be accessible. Woods Bagot is now committed to archiving copies of original software installation media and product keys along with their born digital architectural records.

One of the more interesting discoveries was a Word document copy of the WOODS BAGOT QUALITY MANAGEMENT SYSTEM, which was a very clearly defined protocol – a manual really – for the entire design process at Woods Bagot, from pre-commissioning to post-contract evaluation.

The SYSTEM also defined a stringent set of filing conventions dealing with the creation, storage and destruction of hardcopy documents and drawings. Archiving procedures were described under the heading “dead files”. Interestingly, the QUALITY MANAGEMENT SYSTEM did not explicitly mention how to deal with digital files, which were the responsibility of the IT manager.

It appears that, at this time c1995, legal liability was perceived by Woods Bagot to rest in paper records, rather than in digital ones.

Meanwhile in Melbourne:

We selected Storey Hall because it was a project that pushed the envelope for what was possible – or what was believed to be possible - of digital technology in architectural practice.

As was the case at Woods Bagot, the Storey Hall digital archive was given to me by ARM IT staff on a USB stick. Very convenient.

SLIDE 6 – Storey Hall façade detail – photograph by Chris Burns 2015

This is a detail of the Storey Hall façade.

At ARM in the mid-1990s born digital files were originally archived on floppy disks. Later these files were migrated onto writable CDs. Antony McPhee, one of the architects who worked on Storey Hall, told me that the early CDs were even less reliable than the floppy disks they replaced, and that disk failures were very common. Later again the files on CD were uploaded onto the office server, where they remain today.

Unfortunately these original floppy disks and CDs have not survived. It's unfortunate because it is now impossible to know how the files in the Storey Hall archive were arranged at the time of their creation. Likewise it is difficult to know what may or may not be missing.

Meanwhile, maintaining the Woods Bagot digital archive offline on CDs – as an accidental by product – has protected the integrity of the records over time and prevented them from accidental alteration or tampering. In the case of Ridgway we're looking at a time capsule with a very clear provenance; not so in the case of Storey Hall.

Digital records are increasingly archived 'online' subjecting them to the possibility of accidental, or purposeful, modification or erasure. While original 'offline' carrying media remain viable (or intact as a disk image) a clearer provenance can be established for digital records.

While born digital records were archived on disks the day-to-day backup was carried out on magnetic tapes, and it was common practice for the principals to take tape drives home overnight in case the office burned down. This is an indication of the value that ARM placed on their digital records at the time.

SLIDE 7 – 3D AutoCAD Model of RMIT Storey Hall Gallery – courtesy ARM architecture

Obviously missing from the Ridgway archive but abundant in the Storey Hall archive are records of the conceptual design process.

ARM were using 3D CAD (as opposed to 2D CAD at Woods Bagot) as a design tool right from the very beginning of the process on Storey Hall. This is evident in the large number of

AutoCAD and 3D Studio MAX models which are conceptual, rather than documentary, in nature – although, of course, AutoCAD was used for design documentation as well.

Quite a lot of wire frame 3D modelling was done in AutoCAD, as you can see from the slide here.

SLIDE 8 – RMIT Storey Hall cross-section rendering – courtesy ARM architecture

This is a rendering of the Storey Hall auditorium created in 3DS Max.

SLIDE 9 – RMIT Storey Hall auditorium rendering – courtesy ARM architecture

With a couple of exceptions all of these files from Storey Hall could be opened in recent (2015) versions of AutoCAD and 3DS Max.

SLIDE 10 – 3DS MAX sketch model – courtesy ARM architecture

Interestingly the Storey Hall CAD files look more sophisticated or 'slick' today than they would originally have because of more advanced rendering technology. This brings into question their authenticity as artefacts of a design process – to be strictly speaking "authentic" they would need to be viewed in the original environment in which they were created (and this includes the presence of the original modelling tools with which they were created).

I had hoped to show you screenshots of the same digital object in both 1995 and 2015 versions of 3D Studio Max side by side – I think it would have made an interesting comparison.

While I was able to locate installation media, product keys and activation codes for mid-1990s era versions of the software within the School of Art Architecture and Design here at UniSA. However my investigations in this direction reached a dead end when I learned that copy protection for AutoCAD products in this era was in the form of a hardware dongle that needed to be plugged into the serial port of the computer in question to run the software. All of these dongles had unfortunately disappeared from the school's IT department.

To conclude:

The case studies represent two ends of a spectrum of use for digital technology in the early to mid-1990s. ARM used sophisticated 3D CAD software from the beginning of the design process on Storey Hall to realise geometries that could not be achieved (easily) with traditional methods.

Woods Bagot, on the other hand, employed computer aided drafting to automate some aspects of labour intensive manual drafting processes during the design documentation phase.

While the Ridgway archive mainly contains what Greg Lynn might describe as 'the rote requirements of designing a building,' within the Storey Hall archive can be found 'evidence of critical moments in the design process.'

These quotations come from the book Archaeology of the Digital by Gregg Lynn.[1]

Our investigation has found that individual firms took quite different approaches towards archiving born digital records. However, both case study firms (in the era we are discussing) assumed for digital records the philosophy traditionally adopted for hardcopy records – that is, to put them away in an archive for long-term storage without the ongoing maintenance that is necessary to ensure their longevity.

SLIDE 11 – Notice taped to the slide collection filing cabinet at ARM architecture – photograph by Chris Burns 2015

I'd like to end with a quote from the late Bill Mitchell from 1996, which is contemporary to our case studies and rather prophetic, in light of what we have been and will be discussing over the following two days:

"The combined problems of immense volume, unstable storage media, and obsolete software and hardware add up to some very tough problems for the archivist to deal with. If we take our archival functions seriously, we will have to bring a high level of sophistication to research in order to develop strategies for dealing effectively with digital media. Otherwise we will lose the architecture of the late-twentieth century and beyond."[2]

[1] Lynn, Greg (ed) *Archaeology of the Digital,* Montreal (Canadian Centre for Architecture and Sternberg Press 2013) p. 13

[2] Mitchell, William J. "Architectural Archives in the Digital Era," *The American Archivist*, Vol. 59, No. 2, Special Issue on Architecture (Spring, 1996), pp. 200-204