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ARCHAEOLOGY OF WOODVILLE, AUCKLAND: 3D MODELLING OF BUILT HERITAGE

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Introduction

A property in Remuera, Auckland has been re-developed and a historic house (Figure 1), previously known as Woodville, moved off-site and a small cottage demolished. The results of the archaeological recording and investigations at Woodville complemented earlier work done by Pearson (2005), Foster (2005), the landscape studies by Adam (2005, 2006) and the photographic recording of the house by Hamish Macdonald. The archaeological report (Bickler et al. 2010) focused on four additional elements:

- detailed architectural recording of the profiles of the house and cottage,
- recording of structural information exposed during demolition of the cottage and removal of the house,
- the results of the excavation of foundations and areas under and around the structures,
- 3D computer based modelling to integrate the information and interpret the evolution of the property.

The project afforded us the opportunity to explore some of the emerging technologies available for buildings archaeology and assess their efficacy in the heritage consulting arena. The results show that 3D computer based modelling provided a useful tool to expand the original architectural recording carried out and to explore the dynamic nature of buildings both as “living structures” in their own right and within their broader landscape.

Historical background

The history of the Woodville property is detailed elsewhere (Pearson 2005, Yoffee 2005) and examined the archaeological report (Bickler et al. 2010). We provide a brief historic sketch here to contextualise the recording carried out.

The property came into European ownership in the early 1850s when the Crown negotiated the purchase of 700 acres of land on the seaward side of Remuera Rd from Maori. The land was subdivided and auctioned in 1852 and was purchased by Major John Gray of the 40th Foot. It is not known whether Major Gray did anything with the land in the two years before it was sold to Samuel Wood in 1854.

Samuel Allen Wood (1813-1884) had the residence he named Woodville built in 1855 or 1856. The property was part of a portfolio of interests and was soon advertised for renting. However, Wood himself apparently was living on the property in 1860 when it was advertised for sale.

The advertisement in the *New Zealander* on 18 April 1860 described a nine room house with stables and outhouses set in a landscape that was grassed with ornamental shrubbery, and orchard and a kitchen garden. In early 1861 the property was sold to Andrew Sinclair.

A number of families were to live at Woodville through the latter part of the 19th century and into the 20th century. The original property was subdivided during that time and there were changes to the house and gardens. Sometime during this period, a cottage was built near the house, probably as servants' quarters.

In 1950 Hugh and Gwendolene Wright acquired the property as a family home and they were to transform the house significantly. The Wrights set about renovating the house soon after moving in and modernized the kitchen and laundry as well as the bathrooms. They later removed the nearby stables and replaced it with a garage.

A large fire in 1957 prompted more changes to the house. It destroyed the ceiling and the roof above the kitchen and ruined the ceilings in the dining room and reception room. Repairs in the ceiling and roof were carried out replicating in part the original construction but other aspects were changed.

Ownership of the property passed from the Wrights in the 1990s and the new owners developed the property further while the older structures have now been removed off site.

Additional architectural recording

Pearson (2005: 29–31) identified a number of possible additions and changes to the house over time. The additional recording of the house focused



Figure 1. View of House and garden looking south east (courtesy Hamish Macdonald).

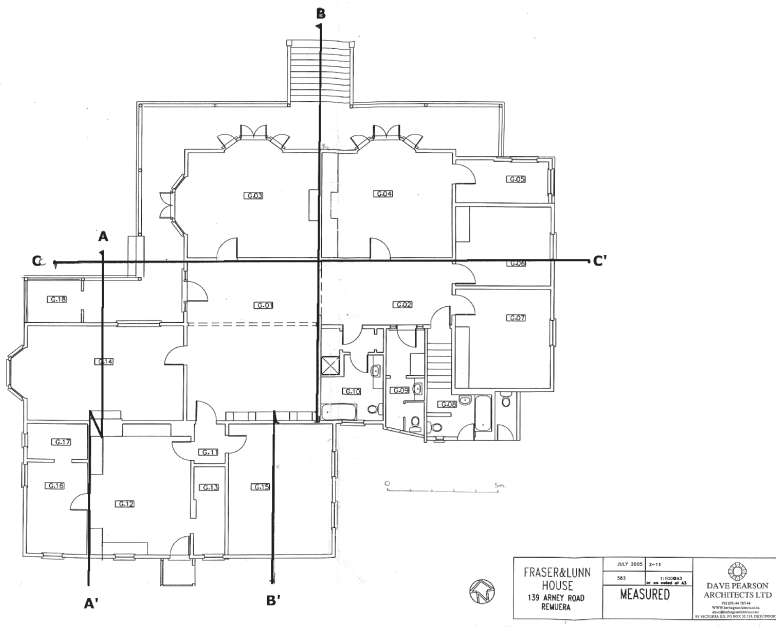


Figure 2. Floor plan of house (Pearson 2005: 18) showing the profiles drawn in detail for the current study.

on tracing the evolution of the house and cottage based on an examination of the materials and methods used, particularly in the roof and basement. The date for the changes was more difficult to establish, although some are known based on the building consents in the 1950s.

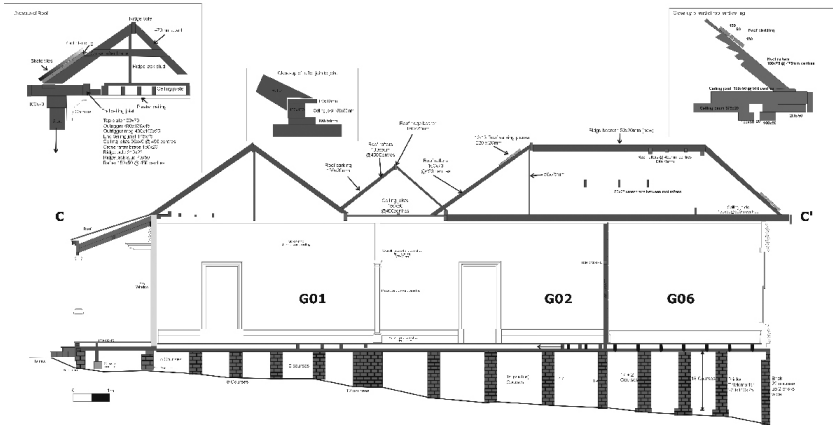


Figure 3. Profile C of house, through the western verandah (left), reception room G01, hall G02 and bedroom G06.

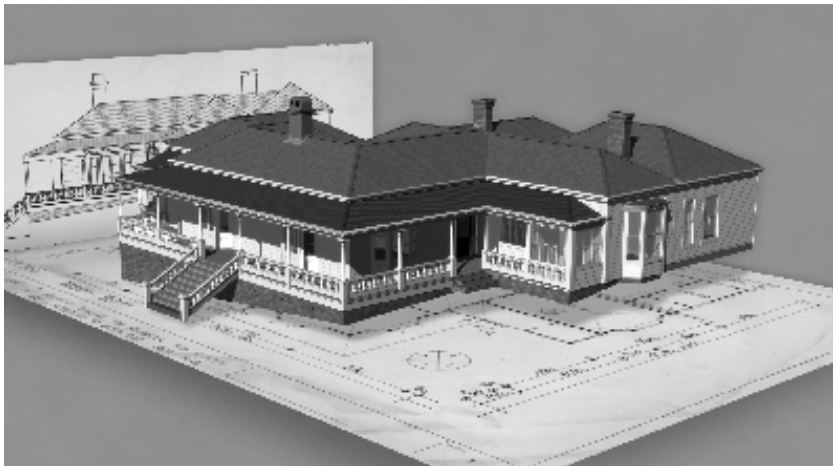


Figure 4. 3D Model of the house with Pearson's (2005) plans.

The results suggested three general phases for the house:

- Phase 1 – the original villa (1855/6–?)
- Phase 2 – middle phase showing the expansion of the house (?–1940s)
- Phase 3 – final phase relating to the Wright family and subsequent owners (1950s on)

Within each main phase further changes occurred.

Three profiles across the house and one for the cottage were followed by way of systematic sampling. These profiles provided the details for the 3D computer models described below. One example is shown here (Figure 3), Profile C, which runs through the least modified aspect of the house with all the rooms of the original villa (see Bickler et al. 2010).

3D modelling

The various sources of information were combined to create a 3D model of the house and cottage. As with all such projects, it was necessary to make choices regarding what was modelled. The choices reflected out research interests in describing:

1. alternative models of the original villa,
2. the exterior of the structures for showing changes to the structures,
3. recording of interior and exterior of the structures,
4. particular structural elements such as flooring and foundations.

The rendered 3D model produced of the house is shown in Figure 4. Missing from the model are exterior elements such as drainage which was relatively modern on the Woodville property and of not such particular interest but could be added in at a later time.

Alternative models

The original villa was likely to have been quite a substantial structure built on totara piles. There are a number of possible scenarios regarding the original layout of the villa. The most likely scenario, we think, was that the original villa was made up of seven rooms with the central hallway access (Figure 5A). This is based on typical villa characteristics (see plans in Salmond 1995: 154–155), with the two rectangular rooms on both sides of the hallway and two rooms at the back. At the front of the house was a parlour room with a bay window and possibly a small verandah. The one chimney between rooms G03 and G04 may be the only one in the original house, the other two being added in the later phases.

Figure 5 options B–E show a range of other possibilities. These include the parlour not being part of the original house, the back rooms not being part of the original house, and versions both with and without a small verandah at the entrance. However, we note that this differs from the advertisement for a nine room house when the room was sold by Wood. It is possible that some of the main rooms were internally divided or the hallway may have been more formally divided and counted as two rooms.

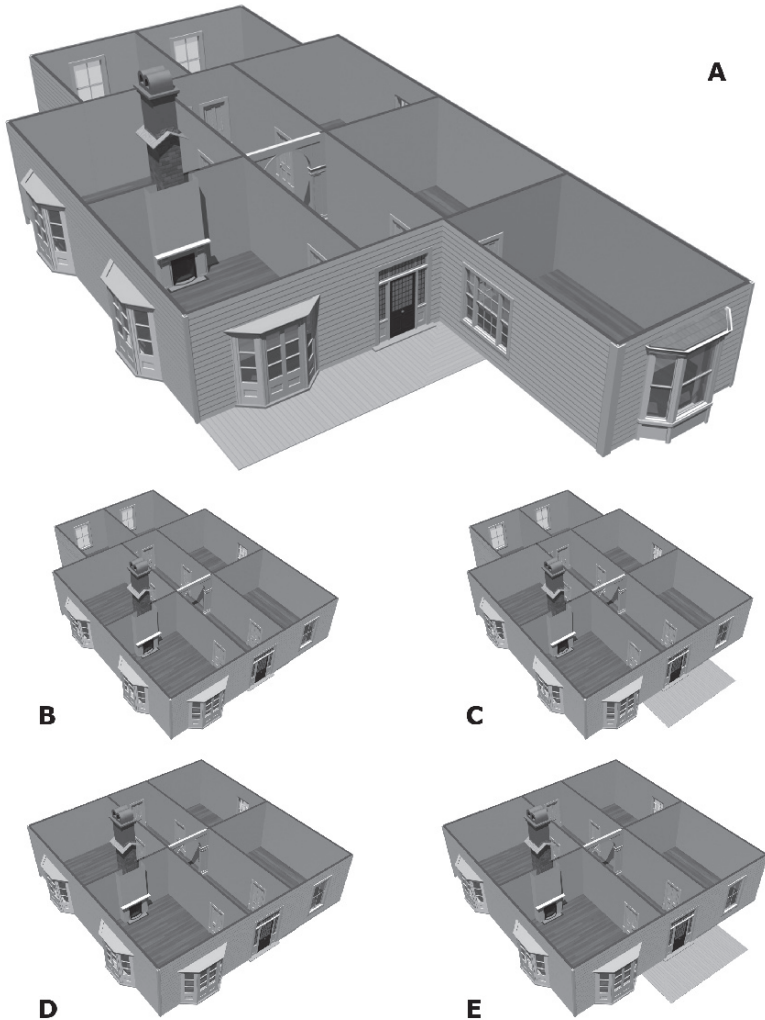


Figure 5. Possible layouts of the original house.

Structural changes through time

While most changes to the house during Phase 2 largely maintained the integrity of the original village by adding on components, the area of the south-eastern corner was significantly altered. We used the 3D Model to

explore different reconstructions to assist to determining the one we felt most likely. Our favoured reconstruction is shown in Figure 6. As suggested in Figure 5, the original villa probably had a rectangular room (G9 and G10) extending to the east to meet the area of the eastern rooms (Figure 6A). This was halved at some point and a new major entrance constructed in the eastern half providing direct access to the back of the original hallway (Figure 6B). Whether this replaced the front entrance to the house at this time is not known, but this is a possibility with access via Woodville Road near the stables.

A small outhouse (G08) was placed next to the entrance at some point and the suspicion is that this was some time after the entrance (G09) had been constructed. This would have been a back or private entrance by the time that structure was in place.

Other changes to this area were made in Phase 3. The plans for the Wright's renovations in the 1950s (Pearson 2005) show the entrance (G09) being enclosed and turned into a cloakroom (Figure 6C) and sometime soon after the outhouse, which had been serving as a bathroom for servants living in the cottage (see Pearson 2005), was incorporated into the main house (Figure 6D). This reconstruction gained some support from the presence of the later wood on concrete piles used below G15.

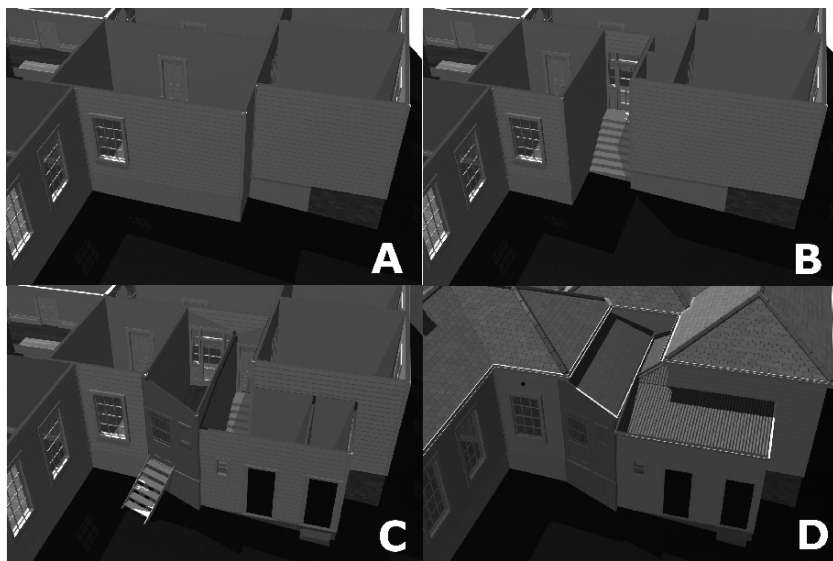


Figure 6. Reconstruction sequence for the south-east corner of the house.

Some additional views of the basement were created (Figures 7 and 8). This served as the primary record for the piling as this was not transferred with the house when it was removed. Reconstructions of the roof space could also have been done but as these were preserved in the house, they were not considered a priority, although the information to do this was available in the architectural recording (Bickler *et al.* 2010).

The Cottage

The demolition of the cottage and its subsequent excavation was added to the drawn up profile to create a 3D model of the wooden cottage (Figure 9). The use of kauri throughout most of the original part of the cottage is not particularly surprising, and illustrates the early preference for this material for building purposes. Other key elements noted in the construction were the mortise and tenon joints between the wall studs and the bottom plate. The walls were covered by a thin kauri sarking, over which gib had been added at some point. Covering that was the later wood framed at the base with kauri.

The eastern and earlier end was investigated after that half of cottage was demolished. The excavation outlined the original brick foundations of the building and remains of the floor plate, totara piles and fragmentary plaster floor. Most interesting was the fill under the floor which contained fragmentary 19th century rubbish fill which included butchered sheep and cow bone. The material was relatively scattered and may have been dumped to level the ground.

Across this layer were a few remnants of piles used for a later wooden floor. Mostly these were a random assortment of bricks suggestive of fairly casual construction. This was most evident in a step along the southern wall and probably predated the wooden floor (probably part of the mid 20th century renovations) which was constructed also of an assortment of brick and other ceramic. One brick from this area was imprinted with the manufacturer 'W. Hunt' which probably dates from the 1880s when Williams Hunt was the brickmaker at the Glenburn brickworks. The yellow brick is characteristic of the west Auckland clay deposits.

The western end of the cottage was less interesting, mostly just a thick concrete pad that had been laid into an area that had been benched into the slope. A grid of bricks was used as piles for a later wooden floor.

Diagnostic artefacts were limited, although the finds included a small number of pottery fragments, animal bones and other pieces suggesting that at various times during the 19th century rubbish pits were in this area but had been disturbed during various activities such as the building of the cottage and additions to the house.



Figure 7. View from NE corner of the house showing floor joists and beams.

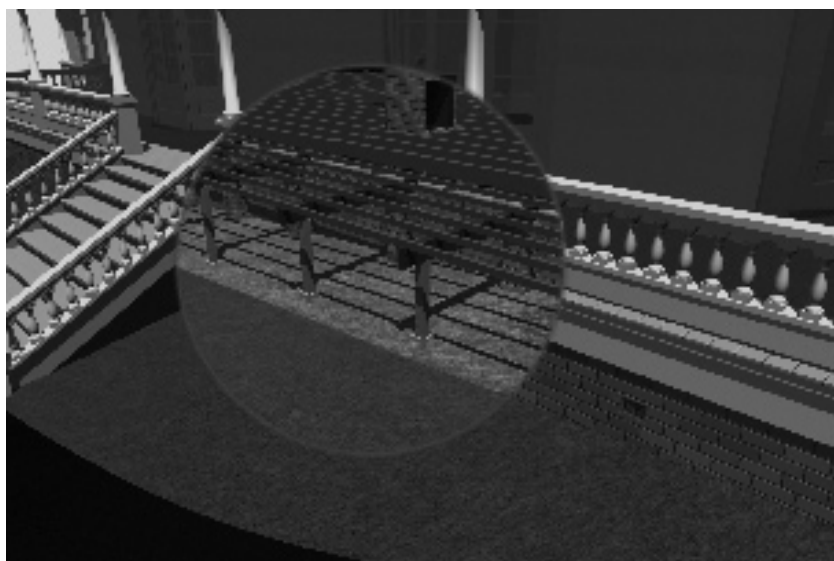


Figure 8. Close-up of the underfloor of the northern verandah.

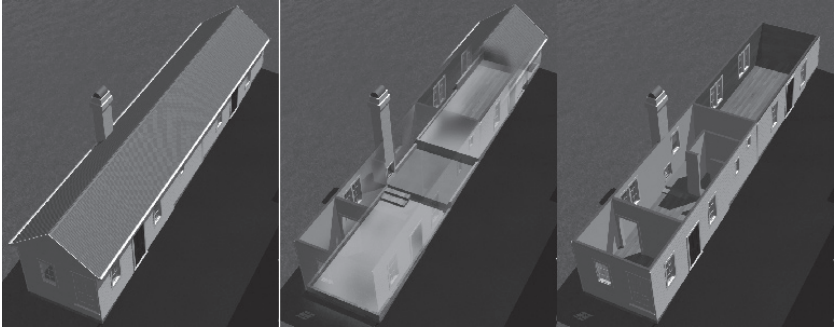


Figure 9. 3D model of the cottage – with roof, flooring only and modern partitions

The results of the analysis suggest that the cottage might have been built in two different stages, the eastern having been earlier. The flooring between the two halves different significantly, but the internal materials used in the two halves were more similar. As the cottage was demolished as a result of the redevelopment the 3D model forms part of the final record of this building.

Landscape

The various models of the structures created were placed with in the context of the property (Figure 10). LiDAR data was used to create the contour and then some digital enhancement of the front garden terraces was carried out. Further reconstruction could have been done to smooth out the terracing and re-create the original topography. The key focus though was to bring the main 3D models of the structures, including the house, cottage, gazebo, front gate and stables together as a record which could be viewed from any angle.

Discussion

The detailed architectural recording along profiles of the house and of the cottage was designed to capture additional building information regarding building techniques that were not immediately apparent during the initial architectural recording. The construction techniques of the underfloor and roof components in particular were detailed and some of the materials not visible prior to demolition were analysed.

The results from traditional archaeological excavation on the property were generally limited. Under the house, very little information was recovered that related to the early history of the house. This probably is because



Figure 10. 3D Computer based model using LIDAR data showing reconstructed terraces.

much of the earliest surface and subsurface remains were probably lost when the house was re-piled. A single wooden crucifix though was found here.

The research identified a pattern of relatively continuous change of the buildings and gardens. We summarised these into three main phases of construction at Woodville: the original villa (1855/6); the middle phase when the house was enlarged (before the 1940s); and the final phase when renovations were carried out by the Wright family and subsequent owners (1950s onwards). Building techniques used in the various renovations did not change dramatically and for most of the history of the house there was some consistency in materials used. We noted that, from the 1960s on, the use of kauri diminished.

The 3D model presented here could also be made significantly more complex. Interior decoration and furnishing could have been added in and where some remnant wallpapers and painted surfaces were recovered these could have been used. Another possibility for showing the changing nature of the villa would have been to illustrate the earlier totara piling of the house of which only a few fragments were recovered along the southern boundary of the villa.

Significantly more work could be added to the landscaping and vegetation. The two main Norfolk pines were shown but a number of other early trees could be modelled and added and these would enhance the development of understanding the social landscape the house inhabited through time.

Conclusion

The 3D modelling of the house presented here is a powerful tool for understanding the development of Woodville and its surrounds. The 3D model constructed does not include all the information gained from the detailed architectural recording of the house, but created a visual representation of the development of the house through time. Perhaps even more valuable is the ability to illustrate alternative scenarios of that development over time and demonstrate the most probable sequence of structural changes. The modelling exercise provided new insights into the history of the house.

These insights included a better appreciation of the sequence of development of the southern entrance to the house and its subsequent enclosure as well as the alternative models of the original villa.

More generally we regard that the simulation and modelling approaches being developed are valuable tools for recording building heritage information. The visualisation is more than an expression of the basic functional aspects of the structures but allows for additional interpretation of motivations regarding the organisation and changes to the structures and their context over time.

Buildings archaeology is an emerging discipline in New Zealand. While traditional architectural history has relied mostly on a study of the remaining standing examples of historic buildings supplemented by archival research, buildings archaeology has added new information to this research. Archaeological recording has been carried out on buildings due for demolition (e.g., Bickler et al. 2007) or, as in the case of Woodville, removal to a new location (also, e.g., Campbell and Furey 2007), and archaeologists have taken the opportunity to strip back the later components of houses as well as examining the foundations of the structures.

We stress the point that such work provides a detailed record of the buildings and this record is easily disseminated and stored for future reference. The development of the long term survivability of our digital heritage remains unknown.

The New Zealand Historic Places Trust Guidelines (NZHPT 2006: 1) summarise the general rationale for carrying out the archaeology of buildings:

Buildings and standing structures can be seen as important components of archaeological sites. Created by past human activity, their investigation using archaeological methods may reveal significant evidence relating to the history of New Zealand... As with other forms of archaeological enquiry, the examination of standing structures provides information that is not normally retrievable through other means.

The results of the work at Woodville do provide interesting information relevant to the history of Auckland. The question of the degree of significance of these sorts of archaeological recording projects in New Zealand though has yet to be examined. The insights obtained during the Woodville project does, however, provide a baseline for further work on houses in central Auckland combining archival, historical, architectural and archaeological evidence with 3D visualisations.

As for the house itself, its removal from Remuera to south Kaipara represents in part a return to the original character of the house. Surrounded by a pastoral landscape and on the edge of suburbia on gently sloping land, the house has been stripped of most of its later additions and returned once more to a context more in keeping with its origins.

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