The Johnstone Centre
REPORT Nº 103

Nathan Cobb's Laboratory
Conservation & Interpretation Project

Nathan Cobb’s Laboratory Site
Conservation Management Plan

by
Dirk H.R. Spennemann

Albury Australia
2004 (Digital Version)
CONTENTS

Contents ............................................... iii
List of Figures ......................................... v
List of Tables ......................................... vii

Executive Summary ................................. viii
Abstract ................................................ viii
1. Introduction ...................................... viii
2. Background ......................................... ix
3. Existing conditions and trends .......... x
4. Issues, needs and opportunities .......... xi
5. Goals and objectives ......................... xi
6. Implementation .................................. xii

1. Introduction ....................................... 1
1.1. Location ............................................ 1
1.2. Ownership ........................................ 1
1.3. Heritage listings etc. .......................... 1
1.4. Authority .......................................... 3
1.5. Target Audience ................................ 3
1.6. Assessment conducted....................... 3

2. Background ....................................... 4
2.1. Description of the site ....................... 4
2.1.1. The laboratory building ................... 4
Cellar .................................................. 11
Staircase .......................................... 14
Roof elements ...................................... 14
Microscope bases ................................... 23
2.1.2. Platforms ......................................... 26
Platform 2 ............................................ 26
Platform 3 ............................................ 26
Platform 4 ............................................ 33
Platform 5 ............................................ 33
Feature 6 ............................................ 33
Platform 7 ............................................ 39
Platform 8 ............................................ 39
Platform 9 ............................................ 39
Artefact scatter .................................... 40
The access track ................................... 43

3. Existing conditions and trends .... 51
3.1. Condition report of the laboratory site ........................................ 51
3.1.1. Description of constituent materials .. 51
3.1.2. Assessment of visible decay, symptoms and causes.............................. 51
Biodecay of timber................................. 51
Infestation with mosses ....................... 53
Infestation with vascular plants .......... 54
Partial collapse of the northern wall .... 57
Iron .................................................. 58
Slopewash ......................................... 58
3.1.3. Assessment of potential decay processes hidden from view ................. 58
3.2. Condition report of the platforms and track .................................. 60
3.2.1. Description of constituent materials ........................................ 60
3.2.2. Assessment of visible decay, symptoms and causes .............................. 60
Erosion ............................................ 60
Corrosion ......................................... 60
Treadage ......................................... 61
3.3. Threat assessment-external threats .. 62
3.3.1. Natural disasters .................................. 62
Storm damage .................................... 62
Landslip .......................................... 62
Earthquakes ....................................... 64
Bushfires ........................................... 64
3.3.2. Utilisation pressures ........................ 65
Student activities .................................. 65
Souveniring and visitor interaction ........ 66
Recreation ........................................... 67
Vandalism ........................................... 67
3.3.3. Climatic conditions ....................... 67

The aircraft site ...................................... 43
2.1.3. Contributing components ................. 43
2.2. Understanding the chronology of the site ........................................ 44
2.3. Historical Context ............................. 46
3.4. Threats emanating from the site..... 69

4. Issues, needs and opportunities... 71
   4.1. Conservation needs .................. 71
       4.1.1. Threats and conditions considered to be an immediate problem .......... 71
       4.1.2. Threats and conditions considered to be an intermediate problem .......... 72
       4.1.3. Conditions which will require monitoring .................................................. 72
   4.2. Conditions which will require further research ........................................... 72
       4.2.1. Assessment of decay rates ........................................ 72
       4.2.2. Assessment of secondary damage ........................................ 74
       4.2.3. Access track management ........................................ 74

5. Goals and objectives .......... 75
   5.1. Statement of Significance ........ 75
       5.1.1. Overall statement of significance ........................................ 75
       5.1.2. Graded statement of significance ........................................ 76
   5.2. Conservation Policy ........ 78
       5.2.1. Basis of approach ........................................ 78
       5.2.2. Ongoing and/or future use of site ........................................ 78

6. Implementation ............ 79
   6.1. Administrative measures .......... 79
       6.1.1. Overarching conservation management policy ........................................ 79
       6.1.2. Listing ........................................ 79
       6.1.3. Appropriate usage ........................................ 79
   6.2. Repair Plan ...................... 80
       6.2.1 Moisture proofing the tops of the cellar walls ........................................ 80
       6.2.2 Moss removal on the granite walls ........................................ 80
       6.2.3 Repointing of the granite walls ........................................ 80
       6.2.4. Vegetation removal on the site ........................................ 80
       6.2.5. Removal of slopewash ........................................ 81
       6.2.6. Access controls ........................................ 81
       6.2.7. Landscaping ........................................ 81
       6.2.8. Stabilisation of slope ........................................ 82
       6.2.9. Move back the concrete slab ........................................ 82
   6.3. Monitoring Plan ................... 82
       6.3.1. Monthly activities ........................................ 82
       6.3.2. Annual activities ........................................ 83
       6.3.3. Event-based ........................................ 83

6.4. Maintenance Plan ............. 83
   6.4.1. Monthly activities ........................................ 83
   6.4.2. Annual activities ........................................ 84
   6.4.3. Event-based ........................................ 84

7. Acknowledgments .......... 85

8. References ..................... 86
   Maps ........................................ 86
   Published sources ................... 86
   Personal communications ........ 88
List of Figures

Figure 1. Location of the Laboratory ruins site on Charles Sturt University Wagga Wagga campus.........................2
Figure 2. Contour map of the eastern slope of Bald Hill, showing the location of the sites discussed in the text.................................................................5
Figure 3. Site plan of the laboratory and its associated features.........................................................................................6
Figure 4. Plan of the laboratory site and the distribution of artefacts and building debris.........................................................7
Figure 5. Northern (front) elevation of the building as shown in the building plans....................................................8
Figure 7. Trace of a verandah post in the concrete render of the verandah. Note the acentric positioning of the bolt hole.................................................................................................................10
Figure 8. Trace of a verandah post in the concrete render of the verandah. Note the bolt hole in the underlying granite foundation stone. ...............................................................10
Figure 9. Plan of the cellar as shown in the construction plans (Scale 1:96 [8 feet to an inch])...........................................11
Figure 10. Western section of the southern cellar wall, Note the quarry marks on the granite block. ..............................12
Figure 11. View of the lintel bars of the cellar door. Also note the badly decayed scarfed top of the door jamb..............................................................12
Figure 12. Eastern section of the southern cellar wall. Example of tuck pointing..........................................................13
Figure 20. Nathan Cobb's laboratory. Large fragment of the concrete roof slab with the interface to the parapet.........................21
Figure 21. Nathan Cobb's laboratory. Cross-section through an end-piece of a concrete roof slab (scale 1:5)...............................................................21
Figure 22. Profile view of the concrete roof slab showing the cinder aggregate..............................................................22
Figure 23. Profile view of the concrete verandah slab showing the granite aggregate......................................................22
Figure 24. Sketch showing the interior of one of Cobb's labs. The picture shows the predecessor of the building under discussion. Note the cramped quarters. (Source: Cobb 1897 c) ........................................23
Figure 25. Nathan Cobb's laboratory, northern section. Railway line anchored into the foundations. The railway line served as a base for a microscope.....................................................24
Figure 26. Drawing of the ideal set up of a microscope (Source: Cobb 1897a).................................................................25
Figure 27. Cobb's Laboratory. Platform Nº 2.........................................................................................................................27
Figure 28 Plan of the water supply in the construction plans (Scale 1:96 [8 feet to an inch]) ........................................27
Figure 29. Cobb's Laboratory. Platform Nº 2. Map of site .........................................................................................28
Figure 30. Cobb's Laboratory. Platform Nº 3.........................................................................................................................29
Figure 31. Cobb's Laboratory. Railway line in platform Nº 3..........................................................................................29
Figure 32. Cobb's Laboratory. Platform Nº 3. Map of site ..........................................................................................30
Figure 33. Cobb's Laboratory. Platform Nº 4. Map of site ..........................................................................................31
Figure 34. Cobb's Laboratory. Platform Nº 4.........................................................................................................................32
Figure 35. Cobb's Laboratory. Platform Nº 5.........................................................................................................................32
Figure 36. Cobb's Laboratory. Feature 6. The moved roof slab........................................................................................33
Figure 37. Cobb's Laboratory. Platform nº 7 Map of the site..........................................................................................34
Figure 38. Cobb's Laboratory. Platform nº 7 Some artefacts of the site (scale 1:1)..........................................................35
Figure 39. Cobb's Laboratory. Platform Nº 7..............................................................36
Figure 40. Cobb's Laboratory. Platform Nº 8..............................................................36
Figure 41. Cobb's Laboratory. Platform nº 8 Map of the site.................................37
Figure 42. Cobb's Laboratory. Platform nº 9 Map of the site.................................38
Figure 43. Cobb's Laboratory. Platform Nº 9..............................................................39
Figure 44. Cobb's Laboratory. The artefacts scatter..............................................40
Figure 45. Cobb's Laboratory. The artefact scatter. Note the remains of the concrete-line water tank.........41
Figure 46. Cobb's Laboratory. Movement of artefacts by curious visitors. Between December 1996 and June 1997 this metal item has been shifted approx. 10m. indicative that the physical appearance of the site is fluent and not stable.................................................................41
Figure 47. The access track to the site, seen from the north........................................42
Figure 48. The access track to the site, seen from the south........................................42
Figure 49. The memorial commemorating the aircraft of 1940..................................43
Figure 50. A row of Agaves, part of the original landscaping..................................44
Figure 51. Nathan Cobb examining wheat varieties in the field with his portable microscope...........44
Figure 52. View of Bald Hill from the east. Note the experimental plots in the foreground...............47
Figure 53. Biodecay of the timber elements of the staircase...................................52
Figure 54. View of the laboratory site from north. Note the plants growing in the ruins..............................52
Figure 55. Eastern section of the southern cellar wall, Note the heavy infestation with mosses along the mortar lines........................................................................53
Figure 56. View of the stems of a vegetation cluster in the site..................................54
Figure 57. View of a section of the northern wall, showing the loss of stones...........55
Figure 58. Plan of the laboratory site and the distribution of major plants growing on the site................56
Figure 59. View of a section of the northern wall, showing the loss of stones...........57
Figure 60. Slopewash-derived soil build-up on the southern verandah......................58
Figure 61. Plan of the laboratory site and a summary of the decay processes at work...59
Figure 62. Beaten access track leading from the main track to the aircraft crash site..................61
Figure 63. View of the northwestern corner of the cellar, looking towards the door to the stairwell. Note the large granite boulders which have rolled into the site. As the cellar was reputedly excavated in the 1960s, these two boulders must have rolled into the site since then.........................63
Figure 64. Near vertical view of the fireplace made from lumps of roofing concrete and the bench made from a plank and bricks collected from the site..........................................................66
Figure 65. This metal object has been moved in the course of six months, from a secluded spot under some trees to the corner of the laboratory building. It is indicative of the interaction many people have with objects contained in sites and representative of many visitor management problems.................................................................................67
Figure 66. Olives, the main invasive species.................................................................68
Figure 67. The original olive orchard along McKeown drive, the source of the olive infestation on Bald Hill..................................................................................................................69
Figure 68. Nathan Cobb's Laboratory, Wagga Wagga Appearance of the south wall of the cellar, 1976........73
List of Tables

Table 1. Probability that granite boulders roll onto a site ................................................................. 63
Table 2. Magnitude of earthquake events just south of Wagga 1985-1993 ........................................ 64
Table 3. Fuel loads for the Bald Hill Area in gm/m2 (Data courtesy Geoff Burrows) .......................... 65
Table 4. Graded significance system adopted for this study ............................................................... 76
Table 5. Graded significance of the individual site components ......................................................... 77
EXECUTIVE SUMMARY

Abstract
The Wagga Wagga campus of Charles Sturt University, as the successor of the Wagga Wagga Experimental Farm, harbours one of the very few select sites which are most closely connected with the development of Australian agriculture and especially wheat production. The site is primarily associated with Nathan Cobb, the first professional and scientifically trained plant pathologist of New South Wales, and later, William Farrer, both whom can be credited with the development of wheat varieties adapted to the Australian environment. Even though Cobb’s laboratory, the first custom-built research laboratory building in New South Wales if not Australia, had been demolished in the 1940s, the remaining ruins, as well as the associated structures, are culturally significant on a national level and need to be cared for appropriately. This conservation management plan aims to do just this.

1. Introduction
The site, known as Cobb’s Experimental Laboratory, is located at the eastern slope of Bald Hill, within the grounds of the Wagga Wagga Campus of Charles Sturt University, some 5km northwest of the centre of Wagga Wagga. The management of the Wagga Wagga campus is the responsibility of the Deputy Vice Chancellor (Academic) who is also the Principal of Wagga Wagga Campus. The site is not yet listed on any of the authoritative heritage registers.

This plan is aimed at the campus management and building maintenance authorities of Charles Sturt University to guide them in the appropriate conservation management of a valuable cultural resource under their care. Site and visitor management issues are not part of this plan and will be presented as a separate document.

2. Background
The site, located on the eastern slope of the Bald Hill, comprises a number of elements. The remaining ruins of Cobb’s Laboratory building are confined to the
foundations, the remains of the verandahs and the partially filled-in cellar. Apart from building rubble scattered across the site, there is nothing of the superstructure left. Part of the site is overgrown with *Callitris* sp. Olives and nitre bushes. The building had four underground cavities, three of which were only very shallow and designed solely to facilitate air flow. The southwestern quadrant formed a formal cellar to which a staircase provided access from the south. In the centre of the foundations was system of four chimneys, one for each quadrant, with separate flues for the first and second floor. To reduce weight and still have a strong, flat and water impermeable roof, the roof slab, of which large fragments survive, was cast from cinder concrete reinforced with railway iron and tie bars.

Close to the northern side of the building two iron railway lines, set into a concrete base, originally served as microscope stands.

Contributing components are several small house platforms, cut into the hillside as well as assorted debris from water tanks and household refuse. The bulk of the artefactual material are corroding iron cans, kerosene cans, glass bottles and fragments of china.

Downslope and south from laboratory site is an artefact scatter comprising large metal objects as well as small pottery and glass fragments. The dominating elements are the remains of two corrugated iron tanks.

Associated with the site are two rows on century plants (*Agave* spp.), the remains of former landscaping, and the access track from McKeown Drive. In the same area, though conceptually unrelated is the place of a memorial commemorating the crash of an Avro Anson training plane in September 1940, which killed all three crew on board.

The ruins of Nathan Cobb's Experimental Laboratory, erected in 1897, are the remains of the third laboratory erected on Wagga Wagga Experimental Farm, the first two being a tent and an associated weatherboard building. No longer needed after Cobb's forced departure from the wheat research, the structure was eventually pulled down in the 1940s, with the bricks being used to erect a piggery.

The structure is closely associated with the work of Nathan Augustus Cobb, the first plant pathologist of the NSW Department of Agriculture. His work encompassed primarily the development a plant pathology laboratory, with special emphasis on the combat of wheat rust. Beyond his wheat research he became, by necessity, involved in the identification and eradication of a wide range plant diseases. In June 1897 Cobb became the acting manager of the Wagga Wagga Experimental Farm.

### 3. Existing conditions and trends

The majority of the constituent materials of the remaining structure is granite, which makes up most of the cellar walls, as well as the foundations. There is also a
substantial amount of concrete render paving of the verandah surrounding the house site. Of the standing fabric the remains of a wooden staircase, as well as a door jamb and a brick pier supporting the door need to be mentioned.

With the absence of a roof, the elements have unhindered access to areas of the ruins of Cobb's laboratory that would normally be sheltered. As a result falling damp in the cellar walls, photodegradation of the timber staircase, moss infestation and the like occurs.

In addition to mosses and lichen, directly within the site, both the cellar and the surface scatter, the following major plants were found growing: on and near the site, Nitre bush and native Pines (*Callitris* sp.), also on and near the site. In addition, small weeds abound, such as thistles in the cellar.

Of concern for the management of the site are the trees, namely Olives (*Olea europaea*) and *Callitris*. The expanding root matter of nitre bushes and especially olives has already caused the collapse of part of the northern cellar wall.

The granite derived soils of the hill are strongly to moderately acid, which has a detrimental effect on the calcium carbonate in the renders and especially the mortar.

As all platforms are fully exposed to the elements, most material susceptible to biodecay has already decayed. Since the platforms have been cut into the hill side, erosion forms the major form of decay to the overall site. The erosion appears to be greater in the areas at below the laboratory than those at or above the laboratory level.

There are a number of external threats that need to be taken into account, ranging from storm damage, land slips releasing granite boulders, and bushfires to visitor and animal impacts.

The artefact scatters to the east of the site contain material which may of interest to some ‘collectors’, mainly people intent on souveniring rather than serious collecting. The ‘good’ items have long been removed. Nevertheless, even if some of the remaining items disappear, part of its ability to tell a story, and part of the significance of the site disappears.

The cellar is open and thus poses a threat to passers-by. Some of the edges of the cellar wall are unstable which might give way under the weight of a person.

**4. Issues, needs and opportunities**

At present an overall conservation plan for the whole of Wagga Wagga campus is lacking. In order to proactively inform the management CSU Wagga campus it is desirable that a systematic conservation needs assessment of Wagga Wagga campus be carried out, and that an overarching conservation policy be drafted. Based on that
needs assessment and the policy a series of conservation management plans will need to be drawn up, of which this plan would ideally form.

The falling damp in the cellar walls is a major problem, which needs to be addressed soon. The continued wetting of the mortar pointing facilitates the growth of mosses, which, together with a slight acidity of the soil, has the potential to decay the mortar leading to instability of the walling.

The growth of vegetation on the site endangers the stability of the foundations. The root matter especially of the olives spreads through the foundations and walling and dislodges stones.

The slope above the sites needs to be stabilised to avoid erosion and resultant slope wash onto the site as well as onto the wash stabilisation.

The visitor impact on the site is the so far unquantifiable factor. It is imperative that systematic baseline data collection be carried out to assess who are the visitors to the site and what their impact will be over time. The baseline data for the establishment of decay rates are very poor.

5. Goals and Objectives

A general statement of significance covering the whole site will be followed by a graded statement of significance assessing the individual components.

The Nathan Cobb’s laboratory ruins on CSU’s Wagga Wagga campus are culturally very significant, because

(i) the place is commemorative of Nathan Augustus Cobb, pre-eminent plant pathologist in New South Wales at the turn of the century, who together with scaloppine in Victoria, laid the scientific foundations for agricultural pest control in Australia.

(ii) the site is commemorative of the wheat selection experiments and the wheat nomenclature research carried out by Nathan Cobb and William Farrer at the Wagga Wagga Experimental Farm;

(iii) the two railway lines embedded in the foundations of the laboratory building, and the third railway line embedded at house platform n° 3 are interpretive of Nathan Cobb’s inventiveness and drive to improve the laboratory equipment available at the time;

(iv) the fabric of the place is demonstrative of the building technology of the day where the need to provide for a flat roof suitable as a working surface led the NSW Department of Public Works to use hitherto uncommon steel reinforced cinder concrete as a roofing material.

(v) the history of the place is indicative of the commitment of the New South Wales government of the day to develop and erect a state of the art research laboratory outside a capital city, custom-built to meet the needs of its plant pathologist;
(vi) the structure represents the first purpose-built research building in the state of NSW, if not entire Australia

(vii) the ruins in its setting in native (regrowth) bushland is evocative of the passage of time since an era of experimental agriculture which was driven by large scale land clearing and eradication of all species

(viii) the remnant bushland is interpretative of Nathan Cobb’s realisation that natural predators, even the ‘common crow’ played both a beneficial and a detrimental role in the chain of diseases affecting agricultural plants and animals.

The laboratory ruins site shall be conserved to the extent feasible in situ and unchanged, as a ruins and serve as an interpretative tool to elucidate the history of agricultural development in New South Wales.

The site in its ruinous state is not suitable for continued use in its original function. In view of its significance, however, the site should be interpreted for the benefit of current and future generations of students studying at CSU Wagga Wagga.

6. IMPLEMENTATION

The implementation of the conservation management plan consist of administrative measures, a repair plan, a monitoring plan and a maintenance plan.

Administrative measures
• Overarching conservation management policy
• Listing on the appropriate registers
• Appropriate usage

Repair Plan
• Moisture proofing the tops of the cellar walls;
• Moss removal on the granite walls;
• Repointing of the granite walls;
• Vegetation removal on site;
• Removal of slopewash;
• Stabilisation of slope;
• Access controls;
• Landscaping; and
• Moving back the concrete slab.

Monitoring Plan
• During and after the conservation management actions prescribed in the repair plan have been carried out a systematic monitoring regime shall be implemented, based on monthly, annual and event-based activities.

Maintenance Plan
• Rubbish removal
• Vegetation management
• Removal of future slopewash

For further information on the conservation aspects of this plan contact:
Dirk H.R. Spennemann, PhD
The Johnstone Centre
Charles Sturt University
P.O. Box 789
Albury NSW 2640
1. INTRODUCTION

The predecessor institution of Charles Sturt University, Wagga Wagga Campus, the Wagga Wagga Agricultural College, celebrated its centenary in 1996. As part of these celebrations it had been planned to adequately manage and interpret the ruins of a laboratory building, commonly known as ‘Farrer’s Lab’, but more accurately to be addressed as Nathan Cobb’s Laboratory, as well as the associated concrete base of a granary. This draft conservation management plan of the resource represents an intermediate step in this process.

1.1. Location

The site, known as Cobb’s Experimental Laboratory, is located at the eastern slope of Bald Hill, the eastern of the “Two Sisters”, within the grounds of the Wagga Wagga Campus of Charles Sturt University, some 5km northwest of the centre of Wagga Wagga. The site overlooks the current vineyards and part of the agricultural farm, with views towards Bomen (figure 1).

Access is possible through an ungraded dirt track which leads to the site from McKeown Drive through a rough fence and gate opposite the winery along a contour line (figure 2).

1.2. Ownership

The site and the surrounding land is owned by Charles Sturt University (Bathurst-Wagga Wagga-Albury), as the successor to the Wagga Wagga Experimental Farm and the Wagga Wagga Agricultural College. The management of the Wagga Wagga campus is the responsibility of the Deputy Vice Chancellor (Academic) who is also the Principal of Wagga Wagga Campus.

1.3. Heritage listings etc.

The site under discussion is not listed on any of the authoritative heritage registers, i.e. the Australian Heritage Commission’s Register of the National Estate (15 entries for Wagga Wagga), the National Trust of Australia (NSW) (39 entries), or the local heritage register as reflected in the Local Environmental Plans (39 entries). This
state of affairs well reflects the overall attitude towards heritage places in Wagga Wagga and shows that historic buildings in town dominate over any other kind of cultural heritage site.

1.4. Authority

This conservation management plan has been prepared by Dr. Dirk H.R. Spennemann, for use by the Principal of the Wagga Wagga campus under the authority of the Vice-Chancellor on behalf of Charles Sturt University as the property owner.

1.5. Target Audience

This plan is aimed at the campus management and building maintenance authorities of Charles Sturt University to guide them in the appropriate conservation management of a valuable cultural resource under their care.
Site and visitor management issues are not part of this plan and will be presented as a separate document.

1.6. Assessment Conducted

The assessment was carried out in three stages. During October 1996 an initial site survey was executed. This concurred with the teaching of a residential school for a subject (taught at Charles Sturt University, Albury) dealing with site survey design. During December 1996 two undergraduate students were employed to map the site components and to provide drawings at a scale of 1:20. The assessment of decay processes and threats to the site was carried out in January and February 1997, with follow up assessments until May 1997. Mr. Mark McCrone assisted in surveying part of the site with a dumpy level, aimed at ascertaining the former slope of the area.
2. BACKGROUND

In this section we will set out the appearance of the site and its contributing features, the site’s history and the social and historic context in which the site needs to be seen.

2.1. DESCRIPTION OF THE SITE

The site, located on the eastern slope of the Bald Hill, comprises a number of elements. In addition to the site and its contributing features under discussion, there are other places which are associated with the site, but which management reasons are (to be) discussed as separate items, such as George Valder’s residence (now Boorooma Writers’ Centre) and the ruins of the granary. The main site, the ruins of the laboratory building has been erected on an artificially widened break in the contour (figure 2). The other elements are cut into the hillside as small platforms on which various buildings (or tents) had been erected or on which activities associated with the laboratory took place.

2.1.1. THE LABORATORY BUILDING

The ruins of Cobb’s Laboratory building are confined to the foundations, the remains of the verandahs and the cellar. Apart from construction debris scattered across the site, there is nothing of the superstructure left.

The area was surveyed, with the location of the platforms and the laboratory site compass mapped. The laboratory foundations were plotted at a scale of 1:20 and the distribution of all artefacts and items was plotted. The cellar walls were drawn in a likewise fashion.

The site comprises of the foundations, and the concrete verandah, as well as a cellar, to which a stairway provides access. Building rubble is scattered all over the site as well as in the cellar, which partially filled with it, as well as some granite boulders, which had rolled down the slope. The distribution of building rubble on the cellar floor was not mapped. The bricks, where complete, measured 110 x 235 x 75 mm, and were hand made, wire-cut, with small quartz grains as temper material. Part of the site is overgrown with Callitris sp. Olives and nitre bushes.
Figure 2. Contour map of the eastern slope of Bald Hill, showing the location of the sites discussed in the text.
Figure 3. Site plan of the laboratory and its associated features.
Figure 4. Plan of the laboratory site and the distribution of artefacts and building debris.
The foundations are oriented according to the compass with a 5° variation from true (magnetic) north. Copies of the original construction plans are held by the NSW State Archives, which, together with historic photographs allow us to appreciate the original appearance of the building (figure 5–6).

The foundations of the site comprised of granite blocks, cut to size, covered with a thin layer of cement render. At regular intervals (see figure 4) the markings of a quadrangular wooden posts with a central bolt anchor can be found (figure 7), suggesting that the final render of the verandah was applied after the building had been finished. It worth noting that the bolt hole in the concrete, which has been drilled into the granite foundation underneath (figure 8) is never in a centred position compared to the trace of the post.
Figure 6 Nathan Cobb’s Laboratory, Wagga Wagga Appearance of the building shortly after completion.
Figure 7. Trace of a verandah post in the concrete render of the verandah. Note the acentric positioning of the bolt hole.

Figure 8. Trace of a verandah post in the concrete render of the verandah. Note the bolt hole in the underlying granite foundation stone.
At the southern end of the verandah a glazed brown water pipe can be seen flush with the concrete surface. The knee pipe runs underneath the verandah towards the cellar, but does not emerged there.

**Cellar**

The building had four underground cavities, three of which were only very shallow and designed solely to facilitate airflow. The southwestern quadrant formed a formal cellar to which a staircase provided access from the south. In the centre of the foundations was system of four chimneys, one for each quadrant, with separate flues for the first and second floor. The chimney section formed a small quadrangle set at a 45° angle to the outer walls (see building plan; figure 9).
Dirk H.R. Spennemann,
Nathan Cobb’s Laboratory Site, Charles Sturt University, Wagga Wagga • Conservation Management Plan.

Figure 10. Western section of the southern cellar wall. Note the quarry marks on the granite block.

The foundations and the walls of the cellar are made from quarried rectangular granite blocks of irregular size, even though irregular blocks also occur. Several of the blocks still exhibit quarry marks exposed towards the interior of the cellar (figure 10), suggesting that the level of craftsmanship (or funding) was low. To provide some form of visual regularity the interior wall was tuck pointed (figure 13).

A doorway leads from the staircase into the cellar. Only one of the doorjambs survives, with two brick pillars and two narrow, curved steel lintels (figure 11).
Figure 11. View of the lintel bars of the cellar door. Also note the badly decayed scarfed top of the door jamb.

Figure 12. Nathan Cobb’s Laboratory, Wagga Wagga Appearance of the east wall of the cellar, December 1996.
Figure 13. Eastern section of the north-eastern cellar wall. Example of tuck pointing.

Staircase

The staircase to the cellar was established outside the walling of the house. It has granite walls with a wooden one-piece staircase (figure 18-19). Of the staircase only the wooden risers survive (figure 20). The treads have either decayed or have been taken away for other purposes, such as firewood.

Roof elements

The building had been designed by Cobb to posses a flat roof which would permit the sorting of wheat specimens and the drying of plant samples. To reduce weight and still have a strong, flat and water impermeable roof, the roof slab was cast from cinder concrete reinforced with railway iron and tie bars.
Figure 14 Nathan Cobb’s Laboratory, Wagga Wagga. Appearance of the north wall of the cellar, December 1996.
Figure 15 Nathan Cobb’s Laboratory, Wagga Wagga. Appearance of the west wall of the cellar, December 1996.
Figure 16 Nathan Cobb’s Laboratory, Wagga Wagga. Appearance of the northeastern wall of the cellar, December 1996.
Figure 17 Nathan Cobb’s Laboratory, Wagga Wagga. Appearance of the southern wall of the cellar, December 1996.
Figure 18 Nathan Cobb's Laboratory, Wagga Wagga. Appearance of the west wall of the stairwell leading to the cellar, December 1996.
Figure 19 Nathan Cobb’s Laboratory, Wagga Wagga. Appearance of the east wall of the stairwell leading to the cellar, December 1996.
Figure 20. Nathan Cobb’s laboratory. Large fragment of the concrete roof slab with the interface to the parapet.

Figure 21. Nathan Cobb’s laboratory. Cross-section through an end-piece of a concrete roof slab (scale 1:5).
Figure 22. Profile view of the concrete roof slab showing the cinder aggregate

Figure 23. Profile view of the concrete verandah slab showing the granite aggregate
According to the building plans the roof slab had a slight camber to it, which apparently also had a spoon drains around all sides (figure 21-21). After the demolition of the building the roof slab had been broken up in several large and smaller pieces. It would appear from the remains encountered on the site that the railway line reinforcements have been removed, while (most ?)steel tie bars, with anchor plates have been left in place. The surface of the concrete has been rendered with a thin layer of cement.

The reinforcement bars have a diameter of 1 inch (25mm), with two perforations, approx one inch from the threaded end. The tie-bars had been anchored into the side walls with anchor plates with a single quadrangular nut.

The aggregate comprises largely of black gaseous cinder (figure 22) as well as some glassy cinder elements. The size of the aggregate is about one to one and a half inches (2.5 to 4cm). By comparison, the aggregate used for the concrete verandah, as well as the coping of the cellar walls does not contain any cinder, but granite and some quartz (figure 23). The cinders, black in colour, appear to be the residue from coal gas manufacture.

Figure 24. Sketch showing the interior of one of Cobb’s labs. The picture shows the predecessor of the building under discussion. Note the cramped quarters. (Source: Cobb 1897 c).
Figure 25. Nathan Cobb’s laboratory, northern section. Railway line anchored into the foundations. The railway line served as a base for a microscope.

Microscope bases

Close to the northern side of the building, there are two iron railway lines, protruding 700mm (northeastern rail) and 670mm (northwestern rail) above the surrounding platform area, which are (presumably) set into a concrete base at or below the level of the foundations which served as microscope stands (figure 25). The position of the railway irons would suggest that they would have stood at a window facing north. Another such railway iron was found erected on platform P3 which supported a microscope in the old (wooden) laboratory building moved to that site.

The iron railway lines are described in a newspaper article of the Wagga Wagga Advertiser of 23 October 1897 as follows:
"the room which is to be occupied by Dr Cobb has in it steel railway rails set in solid cement in order that the microscopes and other apparatus may be placed upon them in such a way as to provide against vibration"

Throughout his career Cobb, who was interested in perfecting laboratory and technology and instruments, developed a number of techniques aimed at improving existing microscope technology (Blanchard 1957), and published widely on the matter (eg. Cobb 1897a, 1897b, 1905a, 1905b, 1906; 1916). This included a series of microscopes mounted on a rotating table surface to allow rapid comparison of specimens. There is ample evidence in Nathan Cobb’s writings, that he was very much concerned with the positioning of microscopes near windows to obtain sufficient light (Cobb 1897a), and the need to have a firm and stable base for the microscopes to stand on without any vibrations (figure 26. Cobb 1897a).

2.1.2. Platforms

Contributing components are a number of small house platforms, cut into the hill side as well a assorted debris from water tanks and household refuse.

Platform 2

Located immediately south of the laboratory building site is platform F2, which is oriented north-south (figure 27). The platform is approximately 15.5m long and 5.2m wide, its boundaries to the west and east (up and downslope) being defined by boulders and rubble. The northern boundary is defined by the drop-off to the laboratory site. Upon inspection of the building plans for the laboratory, as well as available photographs, it appears that the platform would have provided access to the four round storage tanks (figure 28). The remains of these tanks have been found in the artefact scatter down slope (figure 43).

Platform 3

Further to the south is platform F3, cut into the hill side west of the track. The platform measures 6m in width (E-W) and 8.3m in length (N-S). It is covered in low grass vegetation and appears to be strewn with building rubble and artefactual material (figure 30). Encountered were mainly glass bottle fragments, tin cans and the like.
Figure 26. Drawing of the ideal set up of a microscope (Source: Cobb 1897a).
At the northern end of the platform an iron railway line has been placed vertically into the ground (figure 31). The iron rail protrudes approx. 0.7m from the ground and resembles the iron railway lines already observed in the laboratory ruins (see above). It would appear that the railway line in the ground served a similar purpose, especially as the height above surrounding ground level is very similar.

The identification of the platform as a laboratory tent of Cobb's, however, is more complex, as the historic description of the laboratory site (Anonymous 1982) rules out it being the first laboratory:

"The first laboratory was a tent, and in this canvas home of science were initiated several of the doctor's most successful investigations concerning wheat. This tent still remains on the ground, but adjoining it is a fairly large weatherboard building, in which the scientific portion of the work has been conducted for some years past. … The new laboratory is situated right in the midst of the experimental plots, instead of, as is the case with the present one, at a distance of over half a mile. (Anonymous 1982)."
Figure 28 Plan of the water supply in the construction plans (Scale 1:96 [8 feet to an inch])
Figure 29. Cobb’s Laboratory. Platform № 2. Map of site
Figure 30. Cobb’s Laboratory. Platform Nº 3

Figure 31. Cobb’s Laboratory. Railway line in platform Nº 3
Figure 32: Cobb's Laboratory. Platform Nº 3. Map of site
Figure 33. Cobb’s Laboratory. Platform Nº 4. Map of site
Figure 34. Cobb’s Laboratory. Platform Nº 3

Figure 35. Cobb’s Laboratory. Platform Nº 5
Platform 4

Downslope of platform F3 are the traces of another platform-like area, approximately of the same length as platform F3 and dissipating to the track (figure 33-34).

Platform 5

Due west and upslope of the cellar is a small platform, measuring approximately 4m in length and two metres in width (figure 35). The function of the platform is unclear.

Feature 6

Feature F6 is a large section of concrete roof slab, measuring 1.2m in length at a straight edge and 1.1 m to the other direction. Given the straight edge it would appear to have been part of the edge of the concrete roof slab (figure 36)
Lying in the middle of the track leading from the laboratory site to the south, it appears that it had been picked up by people, presumably students, and carried from the laboratory site to a picnic / hang out area, but dropped because it had become too heavy. The placement of the slab indicates the extent of threat to the site caused by unsupervised or unregulated access.
Figure 37. Cobb’s Laboratory. Platform nº 7 Map of the site
Figure 38. Cobb’s Laboratory. Platform nº 7. Some artefacts of the site (scale 1:1)
Figure 39. Cobb’s Laboratory. Platform Nº 7

Figure 40. Cobb’s Laboratory. Platform Nº 8
Figure 41: Cobb's Laboratory. Platform nº 8 Map of the site
Figure 42. Cobb’s Laboratory. Platform nº 9 Map of the site
Platform 7

At the eastern side of the track is a small, ill-defined platform, measuring approximately 7.2m in north-south and 3.8 in east-west dimensions. In the surface of the platform some artefactual matter was observed, among it a piece of china, marked "Royal Ironstone China, Johnson Bros., England" Remarkable is the find of a valve of an oyster shell, suggesting that upper class food items were available at the site (figures 37-39).

Platform 8

Downslope of platform F7 is platform F8, which appears to be well defined towards the north and west as well as towards to the east where it drops off to platform F9, while towards the south the platform merges with the contours of the hill. It is possible that at one point a flat southern access existed to platform F8. The platform measures 6.7m in east-west and 7.8m in north-south dimensions. A granite boulder can be found on the site as well as some artefactual material (figure 40-41).

Platform 9

Platform F9 is well defined, being deeply cut into the hill side. It measures 7.0m in north-south extent and 7.1 m in east-west extent. The drop off at the western (upslope) end is approximately 2 metres. The bottom of the platform is filled with refuse as well as some rounded granite boulders which have rolled into the site.
The bulk of the artefactual material are corroding iron cans, kerosene cans, glass bottles and fragments of china. In particular, noted were several bottle fragments with an embossed motifs (figure 42-43).

**Artefact scatter**

Downslope and north from platform F7 and north of platform F8 is an artefact scatter (figure 44) comprising large metal material as well as small pottery and glass fragments. The dominating elements are the remains of two corrugated iron tanks (figure 45).

In addition, found was chicken mesh wire, cement sheeting, bricks, terra cotta pipe, top of milk bottle, bits of old wine bottles, rim fragment of decorative serving plate, ornamental glass (thick, sugar bowl?), fragments of tin food cans, one oval sardine can, fragment of a cover of a seamed chimney pipe (figure 44). A kerosene tin had bullet holes in it, suggesting shooting target practice activity occurred in the past,

Towards the north, bounded by a row of *Agave* plants, a fence post with wire attached was seen. This post forms the remains of fence and gate erected in the early 1900s.

*Figure 44. Cobb’s Laboratory. The artefact scatter*
Figure 45. Cobb’s Laboratory. The artefact scatter. Note the remains of the concrete-line water tank.

Figure 46. Cobb’s Laboratory. Movement of artefacts by curious visitors. Between December 1996 and June 1997 this metal item has been shifted approx. 10m. indicative that the physical appearance of the site is fluent and not stable.
Figure 47. The access track to the site, seen from the north.

Figure 48. The access track to the site, seen from the south.
The access track

Largely following a contour line an access track leads from McKeown Drive, opposite the current winery, to the laboratory site. The track has a very slight inclination upslope towards the site. The track is cut into the slope and is not surfaced. On occasion granite boulders are protruding. (figures 47-48).

The aircraft site

Physically associated with the laboratory is the place of a memorial commemorating the crash of an Avro Anson training plane in September 1940, which killed all three crew on board (figure 49). The site comprises of a small cross erected in 1994 and which is surrounded by a wire (pool) fence. The site has been included in this plan merely because for reasons of completeness, and because its presence contributes to the decay of the access track.

Figure 49. The memorial commemorating the aircraft of 1940.

2.1.3. Contributing components

On the downslope side of the laboratory site two rows on century plants (*Agave* spp.) have been planted (figure 50). These form part of the original land scaping soon after the completion of the building (not shown on the photos of 1897; see figure 6) and thus form and integral component of the site.
2.2. Understanding the chronology of the site

Prior to the development of the laboratory building and the granary, the crest and upper parts of the hill had been covered with black pine or hill red gum (*Callitris endlicheri*) (*C. glaucophylla* has been observed growing) as well as some *Eucalyptus dealbata*, while the lower sections of the hill and the flatter areas now serving as vineyards, in the 1890s an orchard and wheat experimental plots, had been covered with white box (*Eucalyptus albens*; Jensen 1912).

Some of the timber for the construction of the wooden granary was taken from the hill in 1897. The hill in its semi-denuded denuded state is shown in a photograph published by W. Allen in the *Agricultural Gazette of NSW*, which shows the Wagga orchard with the shed and the experimental building in the far background (Allen 1901).

The Experimental laboratory is the third laboratory erected on Wagga Wagga Experimental Farm, the first two being a tent and an associated weatherboard building, some 'half a mile' away. Both predecessors, however, were standard structures adapted to a use as a laboratory, rather than custom-built structures.
Despite a new structure having been erected there appears to have been need for further experimental laboratories. As a result the old laboratory was moved next to the new one (placed on platform nº 3), repainted and recommissioned.

By 1897 the laboratories were valued at £100 for the old laboratory and £1800 for the new one (Sutherland 1996, p. 12).

Nathan Cobb’s Experimental Laboratory was erected in 1897, firmly based on the ideas and needs of Cobb; these ideas were then translated into architectural feasibility by the then government architect Walter Vernon. Cobb’s desire to have a flat roof with a solid floor, which would allow him to dry and sort grains samples, necessitated Vernon to experiment with a then very new building technology: reinforced concrete.

The building is described in an article of the Wagga Wagga Advertiser of 23 October 1897 as follows:

"On the hill, …, there has been erected a splendid and substantial new laboratory, to which the staff will transfer their location in a few days. The new building makes no pretensions to architectural elegance, but it is no displeasing feature of the view. Dr Cobb is a decided believer in utilitarianism, and, upon his advice, the building has been constructed in such a way as to best meet its object as a scientific workshop. The building is of two storeys and is in the form of a cube, this being the shape which least exposes it either to the cold of winter or the heat of summer. It is substantially constructed of brick and round each storey is a wide verandah or balcony.

Every consideration which could assist in making the building suitable and convenient for its purpose has been taken into account and the arrangements which have been made for simplifying the labours of the scientific staff are as perfect as human ingenuity could make them. Each of the two floors contains 4 large and well ventilated rooms, the access of which is from the outside of the building, but, believing that it might be necessary to provide for direct communication from room to room the walls have been built in such a way as to allow of this being effected at a small expense. Each room has been specially laid out for its intended purpose. Thus, the room which is to be occupied by Dr Cobb has in it steel railway rails set in solid cement in order that the microscopes and other apparatus may be placed upon them in such a way as to provide against vibration. The photographic developing room has also been built with all possible conveniences for the carrying on of the art and the other rooms are equally adapted to their utilitarian objects. Under the building is a cellar with solidly cemented floor, into which runs an 80 feet shaft or tunnel to convey fresh air, which is to be distributed from there all over the building."

Cobb’s successor as the NSW Government wheat experimentalist, William Farrer, mainly worked from his own small laboratory on his farm at Lambrigg near Tharwa (now ACT) and seems to have spent little time at the Wagga farm conducting actual
research; most of his time there was spent on trials. It would appear from the limited evidence in hand that the laboratory building was not used by him at all. In disuse as an active research laboratory, the building served prior World War I as an accommodation for officers (Tome 1987, p. 11), and later as general accommodation for staff.

Because all rooms were single rooms without communicating doorways, and because all rooms had to be accessed from the outside, the building was not very suited for any secondary purpose, even for accommodation—except in times of accommodation shortage.

The fact that the corrugated iron water tanks had been relined with cement to waterproof them after they had partially rusted through suggests on the one hand a continued usage of the site (with demand for water) but on the other also a reluctance by the management of the Experimental farm to expend monies on purchasing new tanks.

As a result structure was eventually pulled down in the 1940s, with the bricks being used to erect a piggery (now also demolished). The building debris was filled into the air spaces below the northern and southeastern quadrants, as well as the cellar. Part of the cellar was excavated in the 1960s by a curious agricultural college staff.

### 2.3. Historical Context

The 1860s saw the development of agriculture of New South Wales expand in line with the population expansion in Sydney and beyond, and the ‘wheat frontier’ being pushed further and further away from Sydney. In the late 1870s the Riverina had become a major grain producer. The development of the southern railway, reaching the border at Albury in 1881, and the establishment of branch lines in the 1890s made increased wheat production a viable option. In the wake of this development, NSW Agriculture in the 1890s extended the establishment of experimental farms, such as Hawkesbury and Wagga Wagga (then called the Murrumbidgee Experimental Farm). The increased production area also implied that plant diseases and their containment could and would play a greater role in the overall productivity of the state.

In 1889 the NSW Department of Agriculture employed an American, Nathan Augustus Cobb, as its first plant pathologist. His work encompassed primarily the development a plant pathology laboratory, with special emphasis on the combat of wheat rust. Beyond his wheat research he became, by necessity, involved in the identification and eradication of various plant diseases ranging from tomato blight to woodiness in apples, from mouldy root of the vine to pumpkin leaf oedium. In addition to the material collected by him, he commented on specimens sent in for assessment, ranging from diseases coffee plants from New Caledonia to soil samples from South Australia. Most of his analyses and descriptions of plant maladies were
published in the *New South Wales Agricultural Gazette*, which were reprinted as extension pamphlets by the New South Wales Department of Agriculture.

Figure 51 Nathan Cobb examining wheat varieties in the field with his portable microscope.

Nathan Cobb was a man of wide interests in agricultural biology, working on fungi, but also nematodes, which had been the focus of his PhD (Cobb 1888) and which were to become his major focus in the United States. As a very gifted Cobb was able to convey a diversity of messages both to his scientific colleagues and to the general public (cf. Sayre 1994).

He was nearly obsessed with the need to have at his disposal efficient laboratory tools, and he was able design many of these himself. The firmly based microscopes have already been mention in the description of the structural remains. He also designed an elevated field camera to photograph his experimental plots and other tools (Blanchard 1957).

It is therefore not surprising that Nathan Cobb, as the plant pathologist and wheat experimentalist was called on to design a laboratory for the Wagga Wagga Experimental Farm, which would, in essence, cater specifically for his needs. This
building was unique in its approach, as it was a fully designed research building, rather than a research laboratory adapted to a existing structure.

In June 1897 Cobb became the acting manager of the Wagga Wagga Experimental Farm, after the previous manager, George Valder, had been called to head up the Hawkesbury Experimental Farm. While manager of the farm he organised open days to advertise the work done on the farm, and ran the fledgling agricultural college (Sutherland 1996, p. 14). Nathan Cobb left Australia on an 18 months sabbatical leave to study the development of agriculture in Europe and the USA. Cobb’s involvement with the management of agricultural institutions is then reflected in the fact that during his stay in Europe and the US he made several visits to agricultural training institutions and published papers on the bulk handling of grain and the appropriateness of agricultural education.

Upon return, some of his main ideas, such as the bulk handling of grain in wheat elevators, was received by a very unreceptive audience. He has already expressed his view in newspaper interviews (cf. Sydney Morning Herald 3 October 1900) in absence from Australia, and it would appear that his detractors had been busily at work. Cobb continued to work as the NSW plant pathologist until 1905, but with his main research area (wheat) taken way from him (see below), he looked out for opportunities for a better, and less infringed position. The opportunity came in 1905 when Nathan Cobb took up a position as the sugar planter’s pathologist in Hawaii. In 1907 he moved to Washington, DC, where eventually he headed up the newly formed US Nematology Laboratory (Hüttel & Golden 1991).
Nathan Cobb’s main work in Australia prior to his sabbatical, however, is inextricably connected with the development of rust resistant wheat varieties. Cobb had experimented with William Farrer in the development of wheat varieties as early as 1891 and had many varieties grown on the Wagga Wagga Experimental Farm plots.

Cobb’s research and the development of Wagga Wagga Experimental farm are closely intertwined from the farm’s very inception. The initial development of the farm began in April 1893 with forty acres of bush land and woodland being cleared, grubbed and ploughed. Sample crops were sown and planted. In the middle May 1893 Cobb went to Wagga Wagga to sow over a period of four days some 200-300 varieties of wheat in drills side by side to test their qualities and to select the best returns for future sowing (Coleman 1894). The aim was to breed and propagate the varieties true to name.

Even though they had collaborated in the past, William Farrer, the man popularly credited with the development of rust resistant wheat varieties in Australia, and Nathan Cobb did not get on at all from about 1892 onwards. Upon return from his overseas trip Cobb found that William Farrer had replaced him as the government’s wheat experimentalist and that he was excluded from continuing this line of research. While Farrer stayed on in his position until his death in 1906, and while Farrer’s friends continued to work along his interests and were thus able to popularise Farrer’s name, (eventually Farrer became ‘the man on the two-dollar note’), Cobb’s contribution to the research and issue sank into obscurity (Campbell 1939; Donath 1970; MacIntyre 1939; Russell 1949). Even Cobb’s laboratory ruins in Wagga had become known as Farrer’s laboratory. After Cobb’s death in 1932 many obituaries were published, with the *New South Wales Agricultural Gazette* for which he had published over 100 papers, being a very notable omission.

Yet assessing the issue from a distance, it would appear that the conflict between Farrer as a self-taught applied researcher and Nathan Cobb as an academically trained scientist (he studied with Ernst Heinrich Häckel at Jena, Germany). Farrer was intent on outcomes, and did not necessarily care how he achieved the results, while Cobb was interested in the results and methodology per se, but was not overly concerned with the outcomes. He believed that taxonomic structure should be worked out to avoid confusion, and in the process may have lost the track of developing effective breeds of wheat. The letter books of the Wagga Wagga Experimental Farm give evidence to the frustration of the farm manager Maurice McKeown (George Valder’s replacement), having to deal with Farrer as the experimentalist who gave contradictory instructions and had to be asked repeatedly to clarify them. Then, if Farrer’s instructions were followed to the letter, Farrer complained behind the manager’s back about the slack or erroneous implementation.
In essence both Cobb and Farrer are associated with the structure and/or much of the early wheat research was carried out in this building and the Wagga Wagga experimental farm in general.

It was these wheat varieties which allowed the agricultural expansion of the Riverina to proceed. Both Cobb and Farrer conducted the research necessary to establish a viable grain industry in Australia. Even new breeds have been bred since then, none of this would have been possible without the foundations laid *inter alia* at the Wagga Wagga Experimental Farm.
3. EXISTING CONDITIONS AND TRENDS

In this section the existing conditions at the site as well as discernible trends will be addressed. These comprise a discussion of the current condition of the constituent materials as well as a review of the threats posed by environmental parameters and anthropogenic actions.

3.1. Condition report of the laboratory site

The main site, the ruins of Cobb’s laboratory, is fully exposed to the elements. With the absence of a roof, the elements have unhindered access to areas that would normally be sheltered. As a result falling damp in the cellar walls, photodegradation of the timber staircase, and the like occurs.

3.1.1. Description of constituent materials

The majority of the constituent materials of the remaining structure is granite, which makes up most of the cellar walls, as well as the foundations. There is also a substantial amount of concrete render paving of the verandah surrounding the house site. Of the standing fabric the remains of a wooden staircase, as well as a door jamb and a brick pier supporting the door need to be mentioned. Among the archaeological debris scattered on top the site as well as in the cellar, the main constituent are bricks as well as aggregate and rubble from the concrete roof together with iron reinforcement.

The bricks seem to be wire cut and locally made without frog marks or stamps which could aid in the identification of the manufacturers. These bricks are quite weak when wet. The cinder concrete has already been described.
3.1.2. ASSESSMENT OF VISIBLE DECAY, SYMPTOMS AND CAUSES

Biodecay of timber

The exposure of the timber to moisture and large temperature variations has let to its decay. The timber is soft in the areas close to the walls, where it is in contact with ground moisture. Fungal infestation is evident.

To a lesser degree the timber of the door jamb and the risers of the staircase is exposed to the effects of ultraviolet radiation, breaking down the lignin in the wood, causing shrinkage and brittleness.
Figure 54. View of the laboratory site from north. Note the plants growing in the ruins.
Figure 55. Eastern section of the southern cellar wall, Note the heavy infestation with mosses along the mortar lines

Infestation with mosses

Much of the granite walls of the cellar are infested with mosses (see figures 55). These flourish because of a combination of two factors. Falling damp caused by open access of moisture into the walling of the cellar as well as the soils volume behind the walls, and a lack of sunshine caused by the large vegetation casting shadows. Even the southern wall of the cellar, which normally would be exposed to the northern midday sun shows moss infestation. The lack of sunlight prevents the walls from drying out. Additional moisture comes from behind: that the mosses grow along the pointing is suggestive that the mortar acts as the conveyor of surface moisture.
In addition to mosses and lichen, directly within the site, both the cellar and the surface scatter, the following major plants were found growing: Olives (Olea europea) on and near the site, Nitre bush and native Pines (Callitris sp.), also on and near the site. In addition, small weeds abound, such as thistles in the cellar.

Of concern for the management of the site are the trees, namely the olives and less so the Callitris, as the latter have a tap root. The expanding root matter of nitre bushes and especially olives has already caused the collapse of part of the northern cellar wall (figure 57). In addition the roots have caused cracks in the cement render by gradually lifting the foundations of the verandah.
Figure 57. View of a section of the western wall, showing the loss of stones

Figure 58 shows a plot of the site and the distribution of major plants growing on the site.
Figure 58. Plan of the laboratory site and the distribution of major plants growing on the site.
Partial collapse of the northern wall

The central section of the northern wall exhibits a hole where at least three quarried and dressed granite blocks are missing, exposing the rubble fill behind. There is no apparent reason for the partial collapse and the stones derived from the hole can nowhere to be found. It would appear that someone pulled out the stones to see what would be behind (figure 59). As a result, though, we do know that the foundations of the partitioning walls of the building were constructed of double-skinned walls with a rubble fill.

Figure 59. View of a section of the northern wall, showing the loss of stones
Iron

The site contains some iron, mainly in the form of the iron lintel bars of the cellar door (figure 12), and as reinforcements of the concrete roof slab. In addition, the railway irons serving as microscope bases need to be considered. These are very solid, however, thereby withstanding much decay for the foreseeable future.

Slopewash

The southwestern and western side of the site has been cut into the hill slope, widening an existing break in the contour. The new slop is not very stable. On the concrete verandah surface clear evidence of slopewash can be found, on which small grasses have taken hold. The slopewash and the vegetation create a moist and slightly acid environment which is not conducive to the preservation of the concrete (figure 60).

3.1.3. Assessment of potential decay processes hidden from view

The granite derived soils are strongly to moderately acid, which has a detrimental effect on the calcium carbonate in the renders and especially the mortar. The ground water flow in the site is unknown and the water retention capacity of the three infilled cellar areas is not known either.
Figure 61. Plan of the laboratory site and a summary of the decay processes at work.
3.2. Condition report of the platforms and track

All platforms are fully exposed to the elements. As a result most material susceptible to biodecay has already decayed. There are no traces of the weatherboard building which had formed the old laboratory (moved to platform 3), nor are there traces of other structures. The fact that the corrugated iron water tanks have been moved to the artefact scatter downslope, suggests that at one point in time a ‘clean-up’ of the area was undertaken.

3.2.1. Description of constituent materials

The constituent materials of the sites comprise mainly of soil as well as artefactual materials brought into the site, namely tin cans (food as well as kerosene), parts of shelving and several elements of galvanised iron strapping. The occurrence of piece of flashing suggests that the weather board building was not removed in toto, but broken up (for firewood?), with the debris in part left on site and the larger elements moved. Most if the platforms contain broken glass, mainly bottle glass, as well as porcelain and glazed pottery.

3.2.2. Assessment of visible decay, symptoms and causes

Erosion

As the platforms have been cut into the hill side, erosion forms the major form of decay to the overall site, rather than to its constituent materials. The erosion appears to be grater in the areas at below the laboratory than those at or above the laboratory level.

In the past the area of bald hill had been used to agist sheep. This activity had beneficial impacts, as it kept the regrowth and seeding of olives to a minimum (but did not prevent it as is evidenced by the number of mature trees in the area), and detrimental effects, as the sheep grazed the vegetation to such a degree that its denudation increased the erosion of the hill slope.

As late as October 1996 sheep were noted as agisted on the hill (pers. comm G. Burrows).
Corrosion

The exposure of the metal elements to the atmosphere of course sets up conditions for corrosion. The presence of trees shadowing most of the sites reduce the amount of sunlight and thus delay the drying out process. Drip water from leaves and branches of overhanging trees also contributes to continued wetting long after a rain shower has passed. Most of the material is in such a state of decay that it can no longer be conserved at reasonable cost, even if this were deemed to be desirable.

Treadage

The access track to the site, which forms part of the overall site, is an unpaved dirt track, with the occasionally protruding granite boulder. As the soil turns quite soft after a rain, increased visitor access is likely to cause erosion and further softening up of the track. Upon a site inspection on 2 June 1997 tracks of a ridden horse had been noted. The hooves of horses are likely to dramatically increase erosion.

Because the aircrash memorial is surrounded by a sturdy galvanised iron fence, it is very conspicuous at the slope below the main access track to the laboratory site and draws people from the track. As a result tracks have been beaten by people, which in turn draw more people (figure 62). As a result erosion occurs as well.
3.3. Threat assessment-external threats

There are a number of external threats that need to be taken into account, ranging from natural disasters to visitor impact and animals.

3.3.1. Natural disasters

Natural disasters are common in Australia, ranging from bushfires to storms and, less commonly, earthquakes.

Storm damage

Storms with associated gusts of high wind speed can conceivably uproot the tree cover in and surrounding the site. The risk of toppling trees, and the concomitant destruction of the archaeological deposits by the upturning root ball, is exacerbated if the soil has been moistened excessively during preceding rainfall.

Landslip

The soil of the hill slopes are loose, deep sandy loams with a sandy subsoil, passing into clayey, rotten granite (Jensen 1912, p. 8). While the soil has little propensity for landslip, there is ample evidence for isolated granite boulders to have rolled down the slope. There are two such boulders in the cellar of the laboratory building, but several more in the stairwell, as well as two boulders on the concrete verandah close to the slope, and there are several such boulders resting on the concrete slab of the granary foundations. At present no clear and uniform indication exists as to the frequency of these events. Table 1. calculates the probabilities of these events occurring, based on the frequency of boulder deposition.

However, these figures need to be interpreted with caution. All sites where a large number of boulders was observed, act as ‘sinks’, where few if any boulders would be able to leave from. On other platforms the low number of boulders may indicate that some boulders simply rolled on, through the site. A case in point is platform nº 8, which does not contain any granite boulders. On the other hand, almost all boulders which found their way into platform nº 9 must have come through platform nº 8.

If we take the higher estimates as the figure for projections of impact, then we have to assume that is a 25% chance for a boulder to roll down the hill and through one of the sites every year. These boulders, each weighing between 30 and 100kgs (approximated) will have a substantial momentum, depending on the length of their ‘run’, which clearly poses a risk to the site, and site management works, such as fences, that may be erected, and to the visitors. The likelihood of landslips will be increased after periods of prolonged rain. In addition, the release of these boulders may be triggered by seismic events (see below).
Table 1. Probability that granite boulders roll onto a site

<table>
<thead>
<tr>
<th>Site</th>
<th>Time expired</th>
<th>Number of boulders ≥3m</th>
<th>Recurrence interval</th>
<th>Probability per year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Laboratory, slope</td>
<td>55</td>
<td>4</td>
<td>13yrs 9 mon</td>
<td>7.3%</td>
</tr>
<tr>
<td>Laboratory, cellar</td>
<td>30</td>
<td>8</td>
<td>3yrs 9 mon</td>
<td>26.7%</td>
</tr>
<tr>
<td>Platform F2</td>
<td>55</td>
<td>2</td>
<td>27yrs 6 mon</td>
<td>3.6%</td>
</tr>
<tr>
<td>Platform F3</td>
<td>55</td>
<td>6</td>
<td>9yrs 2mon</td>
<td>10.9%</td>
</tr>
<tr>
<td>Platform F4</td>
<td>55</td>
<td>0</td>
<td>&gt;55 yrs</td>
<td>&lt;0.1%</td>
</tr>
<tr>
<td>Platform F5</td>
<td>55</td>
<td>2</td>
<td>27yrs 6 mon</td>
<td>3.6%</td>
</tr>
<tr>
<td>Platform F7</td>
<td>55</td>
<td>0</td>
<td>&gt;55 yrs</td>
<td>&lt;0.1%</td>
</tr>
<tr>
<td>Platform F8</td>
<td>55</td>
<td>0</td>
<td>&gt;55 yrs*</td>
<td>&lt;0.1%*</td>
</tr>
<tr>
<td>Platform F9</td>
<td>55</td>
<td>17</td>
<td>3yrs 3 mon</td>
<td>30.9%</td>
</tr>
<tr>
<td>Granary, floor</td>
<td>55</td>
<td>14</td>
<td>3yrs 11 mon</td>
<td>25.5%</td>
</tr>
<tr>
<td>Granary, slope</td>
<td>55+</td>
<td>≤</td>
<td>≤</td>
<td>≤</td>
</tr>
</tbody>
</table>

*see comments in text.

Earthquakes

The Wagga Wagga region is exposed to seismic tremors. While the local epicentres are usually earthquakes of low magnitude, larger magnitude events have been
reported from the Alpine areas, which affected Wagga Wagga in the past (Spennemann 1996). The probabilistic analysis of Gaull et al. (1990) has shown that the Southern Riverina is exposed to a moderate earthquake risk, with a 10% chance of an earthquake even exceeding Modified Mercalli level VI every 50 years. Thus an MM≥VI event would represent the 500 year quake scenario. Given that isoseismal maps for several historic mid-magnitude events (Richter 5-5.5) affecting the Riverina have only been recently reconstructed (Spennemann 1998) are not included in the above analysis, the recurrence interval may well be greater.

A MMVI event would, *inter alia* create “slight damage to buildings with low standards of workmanship, poor mortar … loose material may be dislodged from existing slips, talus slopes or shingle slides” (Eiby 1966). The threats to the site posed by an earthquake event are predominantly derived from the dislodgment of granite boulders upslope of the site.

### Table 2: Magnitude of earthquake events just south of Wagga 1985-1993

<table>
<thead>
<tr>
<th>UT Date</th>
<th>Time</th>
<th>Long</th>
<th>Lat</th>
<th>Mag</th>
<th>Place</th>
</tr>
</thead>
<tbody>
<tr>
<td>1985-07-25</td>
<td>10:17</td>
<td>147.42</td>
<td>-35.37</td>
<td>2.0</td>
<td>S. of Wagga</td>
</tr>
<tr>
<td>1990-09-27</td>
<td>17:45</td>
<td>147.32</td>
<td>-35.30</td>
<td>2.1</td>
<td>S. of Wagga</td>
</tr>
<tr>
<td>1990-09-27</td>
<td>18:05</td>
<td>147.21</td>
<td>-35.31</td>
<td>2.3</td>
<td>S. of Wagga</td>
</tr>
<tr>
<td>1992-01-14</td>
<td>04:25</td>
<td>147.44</td>
<td>-35.35</td>
<td>1.7</td>
<td>S. of Wagga</td>
</tr>
</tbody>
</table>

### Bushfires

Bushfires pose varied threats to the integrity of the Cobb’s Laboratory ruins, as some combustible elements, such as the riser of the staircase and one door jamb are still present. The location of the wooden elements in the cellar, underneath the approaching fire front makes it less likely that a small fire moving up the slope would cause substantive damage. However, if the heat generated by the fire is sustantive, *ie* if the fuel load is high, the timber would be affected by the fire as would be the granite blocks (which are likely to spall due to thermal expansion of the surface compared to the core. Likewise, the concrete render of the verandah surface would spall from the granite foundations.

The location of the laboratory building halfway up the slope makes it prone to the impact of increased heat if a bushfire were to start and makes it way up the slope, driven by winds and fire-generated draft. Whilst the probability of a bushfire affecting the site is comparatively low due to the fact that the hill is isolated and surrounded by cleared farmland, and although the leaf litter build-up at the moment is relatively limited, no fuel reduction is carried out and a lightening strike causing a random fire cannot be excluded.

Fuel loads have been ascertained for three different vegetation zones on Bald Hill (table 3). One by one metre quadrats were placed in areas which appeared to have
the highest fuels loads for the vegetation zone. The data were collected in early August and in late September 1996 (data courtesy Geoff Burrows).

Table 3. Fuel loads for the Bald Hill Area in gm/m² (Data courtesy Geoff Burrows)

<table>
<thead>
<tr>
<th>Assessment time</th>
<th>Vegetation zone</th>
<th>n</th>
<th>Mean</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>early August 1996</td>
<td>hill forest</td>
<td>3</td>
<td>296.0±108.0</td>
<td>200–413</td>
</tr>
<tr>
<td></td>
<td>hill grassland</td>
<td>3</td>
<td>426.7±78.8</td>
<td>355–511</td>
</tr>
<tr>
<td></td>
<td>road side</td>
<td>3</td>
<td>662.3±236.0</td>
<td>418–889</td>
</tr>
<tr>
<td>late September 1996</td>
<td>hill forest</td>
<td>5</td>
<td>298.2±54.8</td>
<td>228–371</td>
</tr>
<tr>
<td></td>
<td>hill grassland</td>
<td>5</td>
<td>438.0±68.0</td>
<td>377–549</td>
</tr>
<tr>
<td></td>
<td>road side</td>
<td>5</td>
<td>763.2±179.9</td>
<td>575–1007</td>
</tr>
</tbody>
</table>

The building is located in the areas of hill forest, with some of the platforms in the zone of hill grassland. While a small ground fire may occur on days of extreme weather conditions, a fuel load of 3 to 4.5 tons/ha for these areas is not enough to sustain a high heat crown fire

3.3.2. Utilisation pressures

The site is located in one of the few bushland areas left within Wagga Wagga campus.

Student activities

As a result, students use the area as a retreat after lectures. There is multiple evidence of student ‘dens’ with an assortment of beer bottles and cans. The track leading past the laboratory site provides easy and convenient access to the central slope of the hill and it can be expected that it is more heavily frequented than any other area. Elements of the laboratory site have already been removed for secondary usage: lumps of concrete were used to form the surrounds of a fire place and bricks were stacked to make a bench to sit on (figure 64). More dramatically, a large slab of the roof concrete was removed from the site and carried some 25 m to the north, where it was discarded (figure 36). It can be speculated that the roof slab was to be transported to a ‘den’ to serve as a seat or for a table-like purpose.
Souveniring and visitor interaction

It is clear from the artefactual evidence visible that the number of artefacts must have been greater in the past than it is today. Some disturbance of artefacts has been observed over the duration of the plan writing period. A good example is the cover a chimney, which had been moved from under the bushes to the east of the laboratory site to a point next to the foundations (figure 65). This behaviour is in line with observations made at other places (Spennemann in prep. b).

The artefact scatters to the east of the site contain material which may of interest to some ‘collectors’, mainly people intent on souveniring rather than serious collecting. The ‘good’ items have long been removed. Nevertheless, even if some of the remaining items disappear, part of its ability to tell a story, and part of the significance of the site disappears.
Recreation

Horse riding has been observed on the track leading to the site in June 1997. This activity will exacerbate erosion (see above). There is danger that the track will be used for trail bike riding and BMX bike riding by students which would increase erosion.

Vandalism

Another type of ‘recreation’ is shooting. A kerosene tin found to have bullet holes in it, suggesting shooting target practice activity occurred in the past. Other evidence of vandalism is that some of the stone on top of the wall separating the cellar from the stairwell have been pushed into the cellar.

3.3.3. Climatic conditions

Because the site is within the Wagga Wagga Experimental Farm, extensive climatic records have been kept, which allow to make the following assertions with some confidence. Average rainfall on the farm is 568mm per year, with a maximum of 104mm recorded for a given 24-hr period. In addition, there are on average 51 frost days per year, with the lowest temperature of -6.3 °C recorded. These conditions can set up freeze-thaw cycles in the building fabric if moisture is present.
3.3.4. OTHER EXTERNALITIES

The infestation of the area with olive trees (*Olea europaea*) is a major problem (figure 66). These trees are varied ages and sizes can be traced back to the importation and growth of olives as part of the arboriculture experiments carried out by the farm. A double of row olive varietals was planted along McKeown Drive in the 1890s (figure 67). Since were first bearing fruit in 1901 (Allen 1901), olives have been spread by various animal vectors all over the hill side and now pose a threat to the structural integrity of the sites, both the granary and the laboratory ruins. In the meantime, these varieties have been identified as of potential commercial value, which may make the removal of larger and thus more fruit producing trees complicated. The olive grove contains varieties not held elsewhere in Australia and thus provides a unique gene pool. Likewise, the feral varieties on the hill may provide unique adaptations to the local conditions (Robards pers. comm 1997).
3.4. Threats emanating from the site

The cellar is open and thus poses a threat to passers by who, upon viewing the cellar, might fall in. Some of the edges of the cellar wall are unstable, which might give way under the weight of a person. Further, on several locations iron rods protrude at odd angles from the block of concrete roof slab. These, together with jagged metal on the ground may pose a risk to visitors while inspecting the site. The presence of places nearby where alcohol is consumed by students may lead to the occasional irresponsible action. So far, no one has fallen into the cellar and no one has been injured while visiting the site.

If Charles Sturt University wishes to use the site for interpretation purposes, then there is need to ensure that it acknowledges its liability and undertakes appropriate steps to mitigate the hazards.
4. ISSUES, NEEDS AND OPPORTUNITIES

At present an overall conservation plan for the whole of Wagga Wagga campus is lacking. As a result the management of the historic structures of the campus appears to be guided by short-term usage intentions while long-term heritage issues seem to take a back seat. In order to proactively inform the management CSU Wagga campus it is desirable that a systematic conservation needs assessment of Wagga Wagga campus be carried out, and that an overarching conservation policy be drafted. Based on that needs assessment and the policy a series of conservation management plans will need to be drawn up, of which this plan would ideally form part.

4.1. Conservation needs

The conservation needs of the Cobb’s laboratory site can be summarised into those threats and conditions which are considered to be an immediate problem; those considered to be an intermediate problem and those which will merely require monitoring.

4.1.1. Threats and conditions considered to be an immediate problem

The falling damp in the cellar walls is a major problem, which needs to be addressed soon. The continued wetting of the mortar pointing facilitates the growth of mosses, which, together with a slight acidity of the soil, has the potential to decay the mortar leading to instability of the walling.

The growth of vegetation on the site endangers the stability of the foundations. The root matter especially of the olives spreads through the foundations and walling and dislodges stones.

The practice of sheep being agisted on Bald Hill should be terminated for good. The sheep both reduce the native vegetation and prevent regrowth and thereby destabilise the slope.
4.1.2. Threats and Conditions Considered to be an Intermediate Problem

The slope above the sites needs to be stabilised to avoid erosion and resultant slope wash onto the site as well as onto the wash stabilisation.

4.1.3. Conditions which will require monitoring

The visitor impact on the site is the so far unquantifiable factor. It is imperative that systematic baseline data collection be carried out to assess who are the visitors to the site and what their impact will be over time.

Figure 68. Nathan Cobb’s Laboratory, Wagga Wagga Appearance of the south wall of the cellar, 1976.

4.2. Conditions which will require further research

4.2.1. Assessment of decay rates

The baseline data for the establishment of decay rates are very poor. In hand are two photographs that were taken in 1976 (figure 68–69) which show the southern cellar wall and the staircase. Compared to 1976 the staircase in 1997 had lost all its
treads, while both risers were still in place, albeit in a state of decay. As mentioned earlier, the infestation with olives is caused by seed dispersal by animal vectors. However, neither the nature of the vectors, nor the rate of dispersal have been ascertained as yet. Depending on the management regime espoused, this information may be required.

Figure 68. Nathan Cobb’s Laboratory, Wagga Wagga Appearance of the south wall of the cellar, 1978.
4.2.2. Assessment of secondary damage

The removal of the trees growing in the site itself is indicated to prevent further root damage to the structural remains. At the same time the continued existence of the tree cover in the vicinity of the site is important as it contributes to the setting and the ambience of the place. Likewise, these trees take in ground moisture. Removal of the trees would probably affect the water balance in the area, which might lead to waterlogging of the cellar following heavy rainfall events, thereby acerbating the decay of the lower sections of the cellar walls.

4.2.3. Access track management

The track currently has a soft cover, mainly compressed soil which is subject to erosion by people and especially horse riders. Whilst it is possible to grade the access track and to cover it with a layer of gravel or bitumen, any such action would substantially alter the original appearance of the track and thus detract from the historical integrity of the place.

It needs to be negotiated with the appropriate Wagga Wagga self help groups whether it is acceptable to open an unpaved track for general public access, including people in wheel chairs, and what precautions need to be taken.
5. GOALS AND OBJECTIVES

5.1. Statement of Significance

A general statement of significance covering the whole site will be followed by a graded statement of significance assessing the individual components.

5.1.1. Overall statement of significance

The Nathan Cobb’s laboratory ruins on CSU’s Wagga Wagga campus are culturally very significant, because

(i) the place is commemorative of Nathan Augustus Cobb, pre-eminent plant pathologist in New South Wales at the turn of the century, who together with scaloppine in Victoria, laid the scientific foundations for agricultural pest control in Australia

(ii) the site is commemorative of the wheat selection experiments and the wheat nomenclature research carried out by Nathan Cobb and William Farrer at the Wagga Wagga Experimental Farm;

(iii) the two railway lines embedded in the foundations of the laboratory building, and the third railway line embedded at house platform nº 3 are interpretive of Nathan Cobb’s inventiveness and drive to improve the laboratory equipment available at the time;

(iv) the fabric of the place is demonstrative of the building technology of the day where the need to provide for a flat roof suitable as a working surface led the NSW Department of Public Works to use hitherto uncommon steel reinforced cinder concrete as a roofing material.

(v) the history of the place is indicative of the commitment of the New South Wales government of the day to develop and erect a state of the art research laboratory outside a capital city, custom-built to meet the needs of its plant pathologist;

(vi) the structure represents the first purpose-built research building in the state of NSW, if not entire Australia
(vii) the ruins in its setting in native (regrowth) bushland is evocative of the passage of time since an era of experimental agriculture which was driven by large scale land clearing and eradication of all species.

(viii) the remnant bushland is interpretative of Nathan Cobb’s realisation that natural predators, even the ‘common crow’ played both a beneficial and a detrimental role in the chain of diseases affecting agricultural plants and animals.

5.1.2. Graded statement of significance

The site and its contributing features can be assessed through a graded statement of significance. The basis for the determination is the structural and historical integrity as set out in sections 2. and 3. Adapting from Kerr (1996, p. 19) a six tier class systems has been adopted (table 4)

<table>
<thead>
<tr>
<th>Significance</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exceptional</td>
<td>of national significance for the whole of the Commonwealth as it is uniquely placed to interpret and event or pattern of Australia’s economical or social history</td>
</tr>
<tr>
<td>Considerable</td>
<td>of state-wide or regional significance</td>
</tr>
<tr>
<td>Some</td>
<td>of local significance</td>
</tr>
<tr>
<td>Little</td>
<td>of significance for the understanding of the Wagga Wagga Experimental farm</td>
</tr>
<tr>
<td>None</td>
<td>of no significance</td>
</tr>
<tr>
<td>Detrimental</td>
<td>intrusive elements that detract for the main significance of the pace</td>
</tr>
</tbody>
</table>
Table 5. Graded significance of the individual site components

<table>
<thead>
<tr>
<th>Component</th>
<th>Grade</th>
<th>Reason</th>
</tr>
</thead>
<tbody>
<tr>
<td>Laboratory Bldg</td>
<td>A</td>
<td>Because of its association with Nathan Cobb and his work, and because of its original architectural features the building site is unique within NSW and perfectly placed to commemorate and illustrate the research work carried out the farm.</td>
</tr>
<tr>
<td>Platform 2</td>
<td>A</td>
<td>This platform is closely associated with the building as it provided the foundation for the water tanks.</td>
</tr>
<tr>
<td>Platform 3</td>
<td>C</td>
<td>As the site of the moved old laboratory building this house platform with its railway-line microscope base is interpretive of the expansive research interests of Nathan Cobb who desired more laboratory space even though a new structure had just been constructed for his needs.</td>
</tr>
<tr>
<td>Platform 4</td>
<td>D</td>
<td>This platform is representative of the overall activities in the area and contributes to the overall impression of the place. In its own it has little significance. The artefactual material contained in the site, however, is interpretive of the activities which took place there.</td>
</tr>
<tr>
<td>Platform 5</td>
<td>D</td>
<td>This platform is representative of the overall activities in the area and contributes to the overall impression of the place. In its own it has little significance.</td>
</tr>
<tr>
<td>Feature 6</td>
<td>F</td>
<td>The moved concrete roof slab in the middle of the track is an intrusive feature on the track, created by irresponsible actions of students.</td>
</tr>
<tr>
<td>Platform 7</td>
<td>D</td>
<td>As platform nº 4</td>
</tr>
<tr>
<td>Platform 8</td>
<td>D</td>
<td>As platform nº 4</td>
</tr>
<tr>
<td>Platform 9</td>
<td>D</td>
<td>As platform nº 4</td>
</tr>
<tr>
<td>Plantings</td>
<td>D</td>
<td>The plantings of Agave form part of the initial land scaping and as such have some significance as contributory elements.</td>
</tr>
<tr>
<td>Artefact scatter</td>
<td>D</td>
<td>The artefact scatter provides the visual evidence of the continued use of the site and thus contributes to the overall significance. In itself is has only limited significance.</td>
</tr>
<tr>
<td>Access track</td>
<td>D</td>
<td>The access track to the site in its unpaved form contributes to the overall impression of the place. In its own it has little significance.</td>
</tr>
<tr>
<td>Aircrash site</td>
<td>F</td>
<td>The current arrangement of the aircrash memorial is visually intrusive. As the memorial is not on the site of the actual crash it has no formal significance at all.</td>
</tr>
</tbody>
</table>
5.2. Conservation Policy

5.2.1. Basis of approach

The laboratory ruins site shall be conserved to the extent feasible in situ and unchanged, as a ruins and serve as an interpretative tool to elucidate the history of agricultural development in New South Wales.

5.2.2. Ongoing and/or future use of site

The site in its ruinous state is not suitable for continued use in its original function. In view of its significance, however, the site should be interpreted for the benefit of current and future generations of students studying at CSU Wagga Wagga.
6. IMPLEMENTATION

The implementation of the conservation management plan consist of administrative measures, a repair plan, a monitoring plan and a maintenance plan.

6.1. ADMINISTRATIVE MEASURES

6.1.1. OVERARCHING CONSERVATION MANAGEMENT POLICY

A conservation management plan for all heritage places on the whole of Wagga Wagga campus should be developed, which sets out the overarching conservation policy and provides a framework for ethical heritage management on campus.

6.1.2. LISTING

Nathan Cobb’s laboratory should be listed on the appropriate registers. In view of its function, construction technique, and historical association the laboratory should be eligible for listing on the Australian Heritage Commission’s Register of the National Estate. In addition the site should be nominated for registration with the National Trust of Australia (NSW).

6.1.3. APPROPRIATE USAGE

The proposed conservation area on Bald Hill, which encompasses the Cobb laboratory ruins site for its cultural values, and the remnant native vegetation for its natural values, is incompatible with the agistment of stock. To ensure that erosion of the area is kept to a minimum and to ensure that native vegetation can regrow, the present exclusion of stock should be continued and formally written into the farm management plan.

6.2. REPAIR PLAN

The activities under the repair plan comprise of the following:

- Moisture proofing the tops of the cellar walls;
• Moss removal on the granite walls;
• Repointing of the granite walls;
• Vegetation removal on site;
• Removal of slopewash;
• Stabilisation of slope;
• Access controls;
• Landscaping; and
• Moving back the concrete slab.

6.2.1 Moisture proofing the tops of the cellar walls

The tops of the cellar walls are currently exposed to the elements and permit the ingress of moisture. The entire top area of the walls shall be cleared of all soil based detritus with a trowel and then a wire brush. The wall tops shall be covered with a coping made from lime-based mortar.

6.2.2 Moss removal on the granite walls

The mosses growing on the granite walls shall be removed by hand and all soil embedded in the granite surface removed by wire brush. Care should be taken that the mosses do not fall into the debris on the cellar floor and add to the soil base for the growth of weeds.

6.2.3 Repointing of the granite walls

After the removal of the mosses all mortar lines shall be assessed for soundness and repointed with a lime based mortar if the need arises. A search shall be made for the four stones missing from the northern cellar wall. If they can be located in the debris on the cellar floor, they shall be reinserted into the walling.

6.2.4 Vegetation removal on the site

The existing vegetation growing on each site needs to be removed. During removal care needs to be taken that the larger plants are cut down and removed in sections. For this purpose it may become necessary to hire a cherry picker. Under no circumstances should the trees be felled, as the falling logs could damage the concrete verandah. Further, the stems of the trees should be cut off at or slightly above ground level and the root ball poisoned to prevent regrowth. The root balls should be allowed to decay in place to prevent damage to the archaeological deposits. The removal of the vegetation should occur under the supervision of a heritage specialist.
all olives growing within 10m of each of the sites, with the exception of the access track, shall be removed in a likewise fashion to limit the reseeding of olives by small mammals.

Olives have the propensity to send up suckers the moment the tree had been cut. In order to prevent regrowth the tree needs to be poisoned using a Garlon/triclopyr based herbicide applied as a distillate (diesel) mixture. Ideal time for the removal is autumn (Dellow 1987; pers. comm).

It is therefore recommended that the Callitris and nitre bushes be cut and removed as soon as possible, but that the olive be left in place until autumn 1998 and then be removed just prior to the seeds ripening.

Any major weeds encountered in the cellar area shall be removed. Large scale application of herbicides shall only be contemplated after the effects of the herbicides on the constituent materials have been researched.

6.2.5. Removal of slopewash

The existing slopewash deposited on the concrete verandah should be removed. During this removal the material should be weighed or otherwise quantified to assess total volume loss. All slopewash should be sent through a 5 or 10mm sieve to retrieve any small artefactual material that may have be present. This work should occur under the supervision of a heritage specialist.

6.2.6. Access controls

The access to the site for horse riders should be formally discouraged, as should be the use of the track or the hill for BMX or motor trail bike riding.

6.2.7. Landscaping

The two rows of Agave sp. had apparently been planted as straight rows to visually delineate the beginning and end of the laboratory complex. Over time these plants have spread side ways through suckers. The plants need to be assessed from an amenity horticulture point of view with the aim of reducing the spread of the plants back to the original narrow planting. Consideration must be given to the life expectancy of the plants. If some of the plants are at the end of their expected life some should be removed and replaced by the young plants which have spread sideways. This ensured visual continuity as well as a continuity of the gene pool of the plants.
6.2.8. Stabilisation of slope

The slope above the sites and the denuded areas should be stabilised using native grasses and appropriate ground cover vegetation. Biostabilisation (Thorne 1990; 1991) is the preferred option. There is need to investigate appropriate native grasses and ground cover plants and to ensure that rabbits do not affect the vegetation gaining hold.

6.2.9. Move back the concrete slab

The concrete roof slab (feature 6), resting on the track some 25m south of the site, should be moved back to the overall rubble scatter. Not only is it out of place in its present location, but is also provides a hindrance for pedestrian, but especially wheel-chair traffic in the area.

6.3. Monitoring Plan

During and after the conservation management actions prescribed in the repair plan have been carried out a systematic monitoring regime shall be implemented, based on monthly, annual and event-based activities.

6.3.1. Monthly activities

The following monitoring activities are recommended to be conducted on a monthly basis:

Assessment of vandalism

- The site shall be assessed on a monthly basis to assess the impact of visitors w.r.t. rubbish deposition, treadage on the site, artefact movement and removal and the like.

Assessment of rubbish accumulation

- A good record of the nature and distribution of the rubbish should be kept before it is removed. Analysis of its distribution may allow us to understand the nature of visitor interaction taking place at the site.

Assessment of weed infestation at the laboratory platform

- The weed infestation on the laboratory platform shall be assessed and mitigative action initiated if required.

Photo points to assess gradual change

- The access track shall be photographed on a monthly basis to ascertain the impact of treadage of the track.
6.3.2. Annual activities

The following monitoring activities are recommended to be conducted on an annual basis:

Photo points to assess gradual change

- The sites shall be photographed on a biannual basis in summer and winter. At each of the features of the site a series of photo points shall be established, which will allow the management authorities to assess gradual changes in site preservation.
- Special attention shall be paid to the (re-)growth of mosses on the granite cellar walls.
  Assess the state of repair of the mortar coping
- The granite walls of the cellar shall be assessed for further damage. Particular attention shall be paid to the effectiveness of the mortar coping to prevent moisture ingress into the walls.

6.3.3. Event-based

The following monitoring activities are recommended to be conducted as the need arises (ie the events occur):

Monitor future slopewash

- When sheet flooding events have been observed on campus, the site should be reinvestigated/monitored to assess the occurrence of new slope wash.

Monitor water logging of cellar

- If possible the cellar should be observed during or immediately after a major rainstorm to assess the presence and extent of water logging of the cellar cavity.

6.4. Maintenance Plan

The maintenance plan is the most crucial component. Like the monitoring plan it should be executed based on monthly, annual and event-based activities.

6.4.1. Monthly activities

The following maintenance activities are recommended to be conducted on a monthly basis:

Rubbish removal

- All debris and rubbish left by visitors should be removed on at least a monthly basis.
- A good record of the nature and distribution of the rubbish should be kept before it is removed.
Vegetation management

- The vegetation growing on the platforms should be kept short using a hand-held slasher. Care needs to be taken not to damage the artefactual material.
- Any weed infestation on the laboratory platform shall be removed by hand.

6.4.2. ANNUAL ACTIVITIES

The following maintenance activities are recommended to be conducted on an annual basis:

Vegetation management

- Systematic removal of all olive seedlings in an area of 10m around each site.

6.4.3. EVENT-BASED

The following maintenance activities are recommended to be conducted as the need arises (ie the events occur):

Remove future slopewash

- New slopewash should be removed when it reoccurs, but the amount of new slopewash should be quantified to allow predictive modelling of events. The slopewash observations should be compared with rainfall records.
7. ACKNOWLEDGMENTS

The sites were drawn at a scale of 1:20 by Kristy Koen and Brett Graham under the direction of the author and Mark McCrone (School of Agriculture) assisted with a partial elevation survey of the area. The author is indebted to the following who assisted in the preparation of this plan by furnishing various information: Lesley Ballantyne (School of Agriculture); Don Boadle (Riverina Archives); Geoff Burrows (School of Agriculture); Mark McCrone (School of Agriculture); Gordon Murray (Agricultural Research Institute); Jim Pratley (Dean, Faculty of Science and Agriculture); Kevin Robards (School of Science and Technology); and June Sutherland (Wagga Wagga).
8. REFERENCES

MAPS

PUBLISHED SOURCES


Pelc, Joan (1980?) *The founding of the Wagga Experiment Farm 1892-1918*. MS typescript, held at CSU Wagga.


**Personal communications**

