

Figure 128 South elevation showing the high-level connection to Machine Bay I, which is shown at left.

Historical background

The White Pan Room is thought to have been constructed in c. 1955 as part of the expansion and modernisation of the Brickworks plant.¹¹⁵ With the now-demolished pan house, sited further north, the White Pan Room further refined raw materials including shale and white clay prior to processing and feeding into the brick presses, housed in the Machine Bays. Located to the east of Machine Bay 1 (Building 14), this facility was solely used for the crushing and refining of white clay. The white clay was brought to the pan house by truck where it was placed in the two hoppers ready to be fed into grinding pans. The grinding pans comprised a rotating perforated metal disc or pan over which large rollers crushed the clay through the perforations. After grinding the raw material was elevated, screened where material still too coarse was returned to the grinding pans and then elevated to the top of the adjoining machine bay to be fed into the brick presses contained within.

The building was also later connected to the Small Crusher House (Building 18), by a conveyor which transported crushed raw materials to be further refined in the White Pan

¹¹⁵ The White Pan Room is described as undergoing renovation in 1955 in Lester Firth Associates 1986, Datasheet C2, but the source for this statement is not cited.

Room, thus increasing the processing capacity of the works. The relationship between Buildings 18 and 19 generally mirrored that of the Primary Crusher House (Building 20) and a now-demolished pan building previously sited behind Machine Bay 3 (Building 16), known as the Red Pan Room. However, unlike the demolished pan house, the subject building also had a hopper for direct raw materials loading.

Description & Integrity

The White Pan Room is a steel framed corrugated steel clad machinery house, with a distinctive roofline of skillion forms of varying heights. Like the Small Crusher House, there is an unloading bay at a higher level where white clay material was directly unloaded into one of two hoppers, both now removed. The structure is framed by off-form concrete walls and the interior has been gutted with the majority of the machinery removed. The removal has exposed large holes in the concrete surrounding the former location of the hoppers.

The machinery house remains generally intact, but the removal of much of the machinery and the interconnections between the White Pan Room and the smaller crusher house have diminished its ability to demonstrate the processes it accommodates.

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Name	Primary Crusher House (Crusher House III)	Reference No	20
Construction	Corrugated galvanised steel over steel frame, retaining wall of concrete	Survey Date	3 December 2009
Historical Phase	Post-war phase, 1944-1976	Date	c. 1955

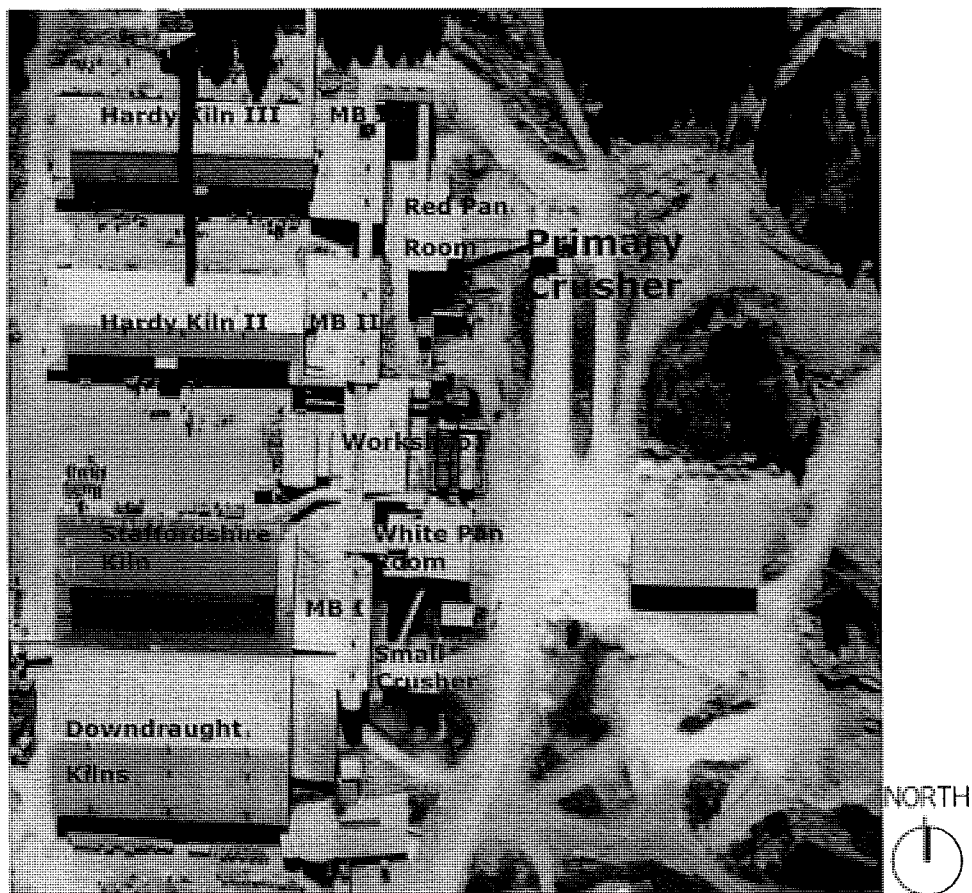


Figure 129 1976 aerial photograph with major site elements in the vicinity of the machine bays labelled. The Primary Crusher House is indicated by a larger font.
 Source: ACT Heritage Library, Woden ACT.



Figure 130 The Primary Crusher House viewed from the west. The concrete footings in the foreground supported the now demolished conveyor which transported crushed material to the Red Pan Room (also demolished) for further refining.

Historical background

The Primary Crusher House was constructed in c. 1955 to process raw materials, which were crushed and then conveyed to the Pan building (demolished) for further screening and grinding. A ramp attached to the crusher provided truck access. The Primary Crusher House contained a Ross feeder for raw shale, with 32" and 18" Jaw Crusher, (Jaques swing jaw crusher) and also a grizzly feeder. It was an integral element of the raw materials processing operations in the expansion of the Brickworks in the post-War period.

Description & Integrity

The Primary Crusher House is of steel framed construction with corrugated galvanised steel cladding. The structure is raised on steel posts and there is a concrete retaining wall to its eastern side. The machinery housing is accessed by a metal ladder from the excavated ground level and there is a truck bay and hopper chute for the delivery of raw material at the higher level.

The structure is in a ruinous state. Parts of the crushing machinery and conveyor are still in evidence. The timber decking within the structure is in a hazardous condition. The building is impacted by a copse of pine trees which appear to have self-seeded in front of the chute.

CANBERRA BRICKWORKS

Name	Elevator/Conveyor	Reference No	21
Construction	Corrugated galvanised steel over steel frame, partially dismantled	Survey Date	3 December 2009
Historical Phase	Post-war phase, 1944-1976	Date	c. 1955



Figure 131 1976 aerial photograph with major site elements in the vicinity of the machine bays labelled. The Conveyor is indicated by a larger font.
Source: ACT Heritage Library, Woden ACT.

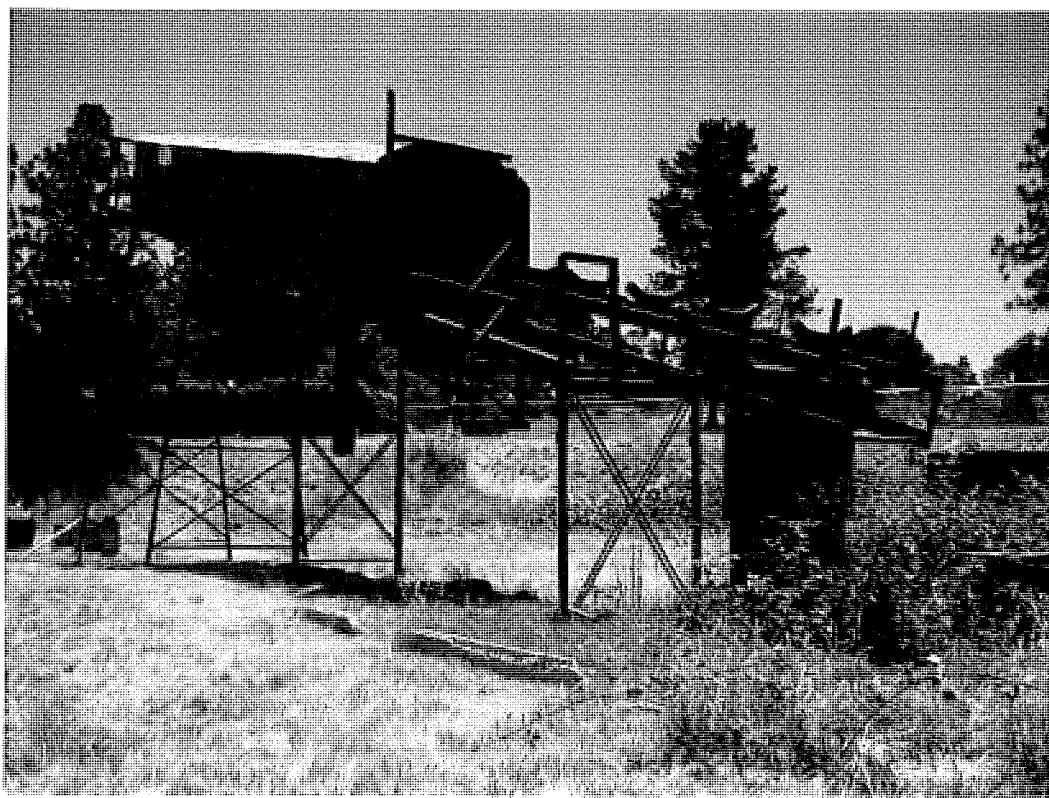


Figure 132 Extant section of the elevator/conveyor looking north-east.

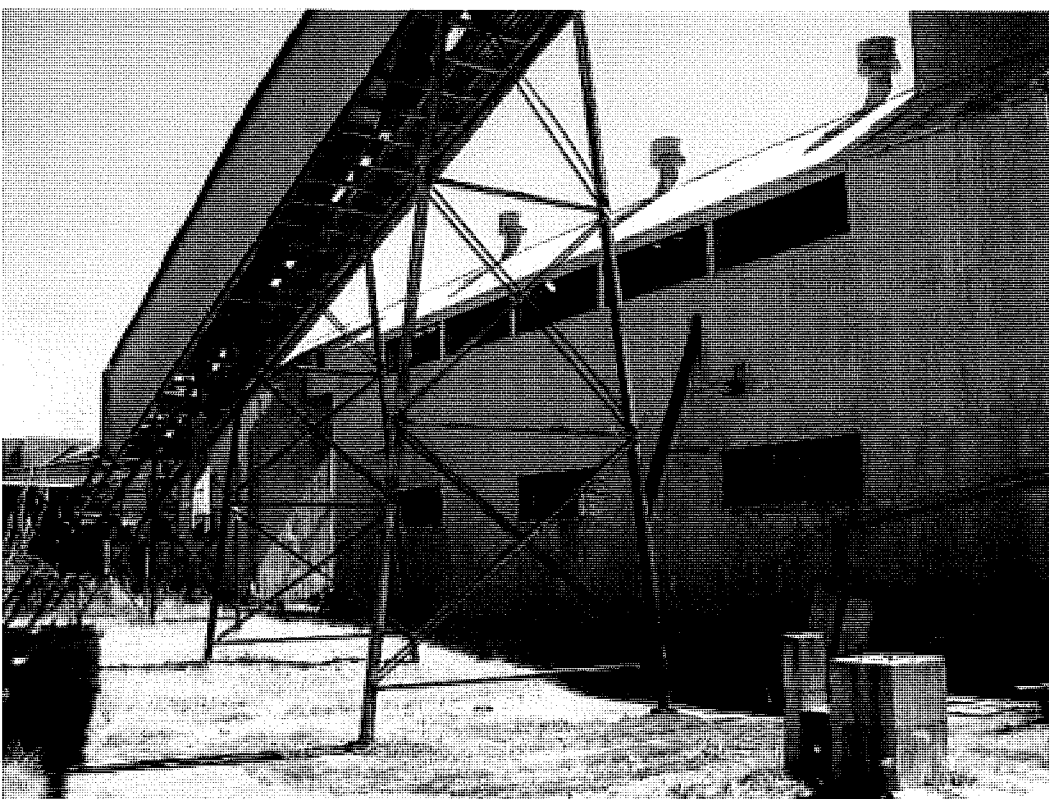


Figure 133 Looking south-west. Machine Bay III (Building 16) is in the background.

Historical background

The Elevator/Conveyor was constructed in c. 1955 as part of the post-War expansion and modernisation of the works. The conveyor, in two parts, transported the crushed shale from the Primary Crusher House (Building 20) to the now demolished White Pan Room building – the site of which is immediately to the rear (east) of Machine Bay II and Machine Bay III (Buildings 15 and 16 respectively). The Pan building ground and screened the crushed shale, and the other section of the conveyor transported it to a distribution hopper which adjoined Machine Bay III. From this point the shale travelled vertically down to the table measures where it was then conveyed by elevator to the top of Machine Bay III joining the loft conveyors to be distributed to the brick presses, housed within the machine bays which serviced each of kilns.

Description & Integrity

The Elevator/Conveyor is a steel-framed structure, clad in corrugated galvanised steel supported on steel stanchions. Part of the conveyor remains in-situ. In the immediate, vicinity footings of the demolished structures, including sections of the dismantled gangway which led from the firing floor of the second Hardy patent kiln (Building 12) to an oil storage depot, the present-day site of the houses in Lane Poole Place, are also present.

The Conveyor is in poor condition. The section linking the demolished pan house to the distribution hopper is only partly intact and the section linking the pan house to the crusher has been demolished. The adjoining distribution hopper structure has also been demolished.

Name	Downdraught Kilns (three kilns and roofed enclosure)	Reference No	22
Construction	Brick (kilns) with corrugated steel roof enclosure (shed)	Survey Date	3 December 2009
Historical Phase	Post-war phase 1944-1976	Date	c. 1960-61

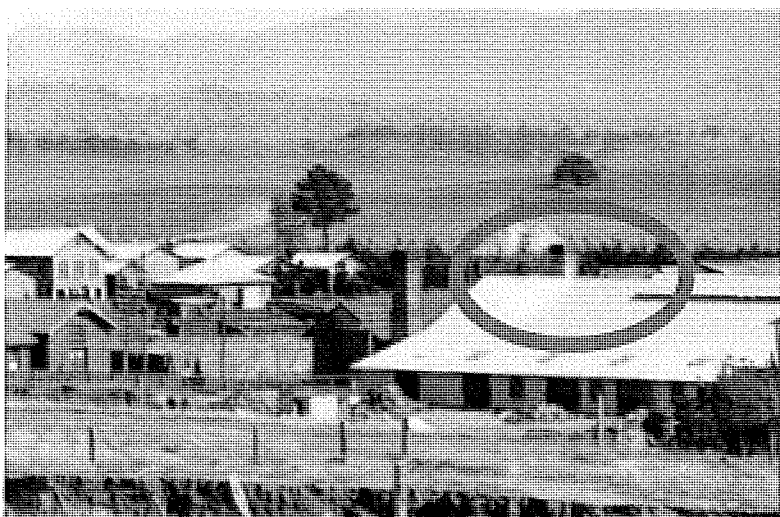


Figure 134 Detail from a 1929 photograph of the brickworks, with the chimney of the temporary downdraught kilns highlighted.
Source: National Archives of Australia.

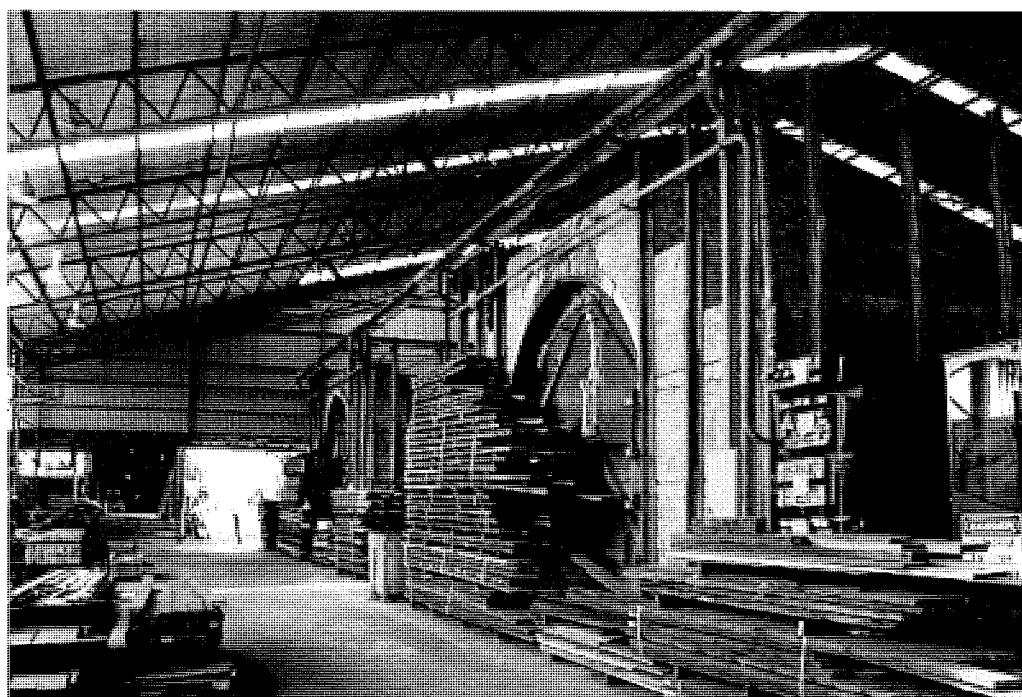


Figure 135 Interior of enclosure showing the north elevation of two of the three kilns.

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Figure 136 Kiln roof with brick walkway to sides.

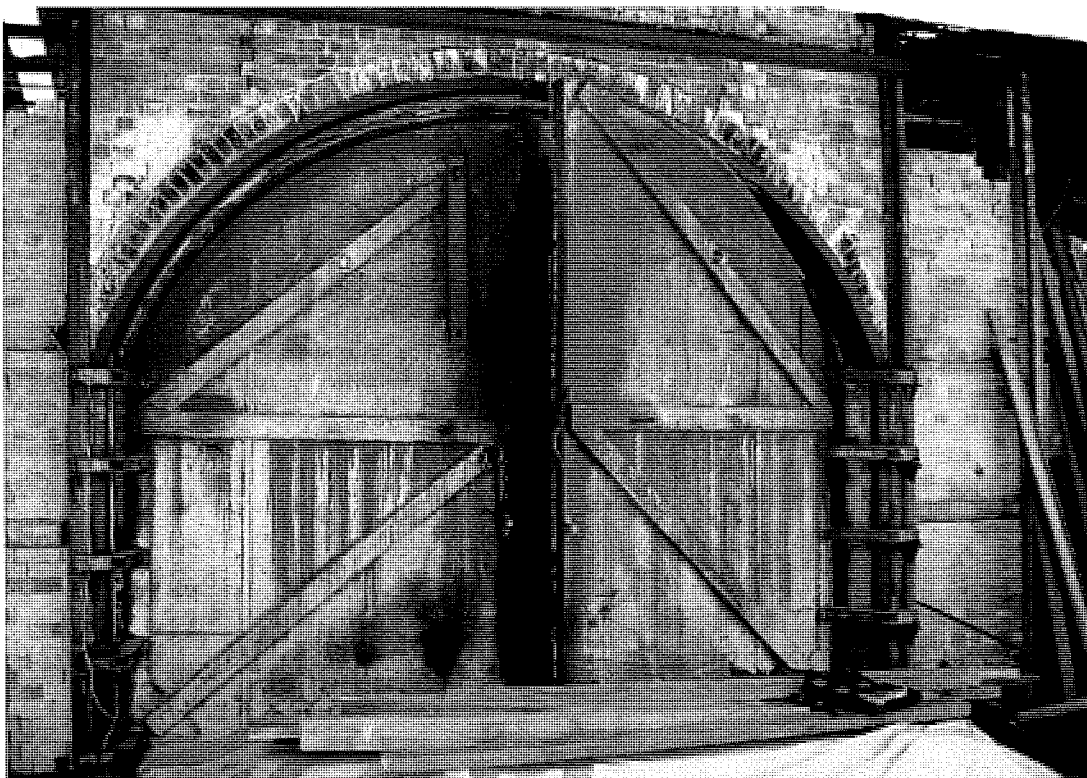


Figure 137 Kiln entry showing stepped side wall.

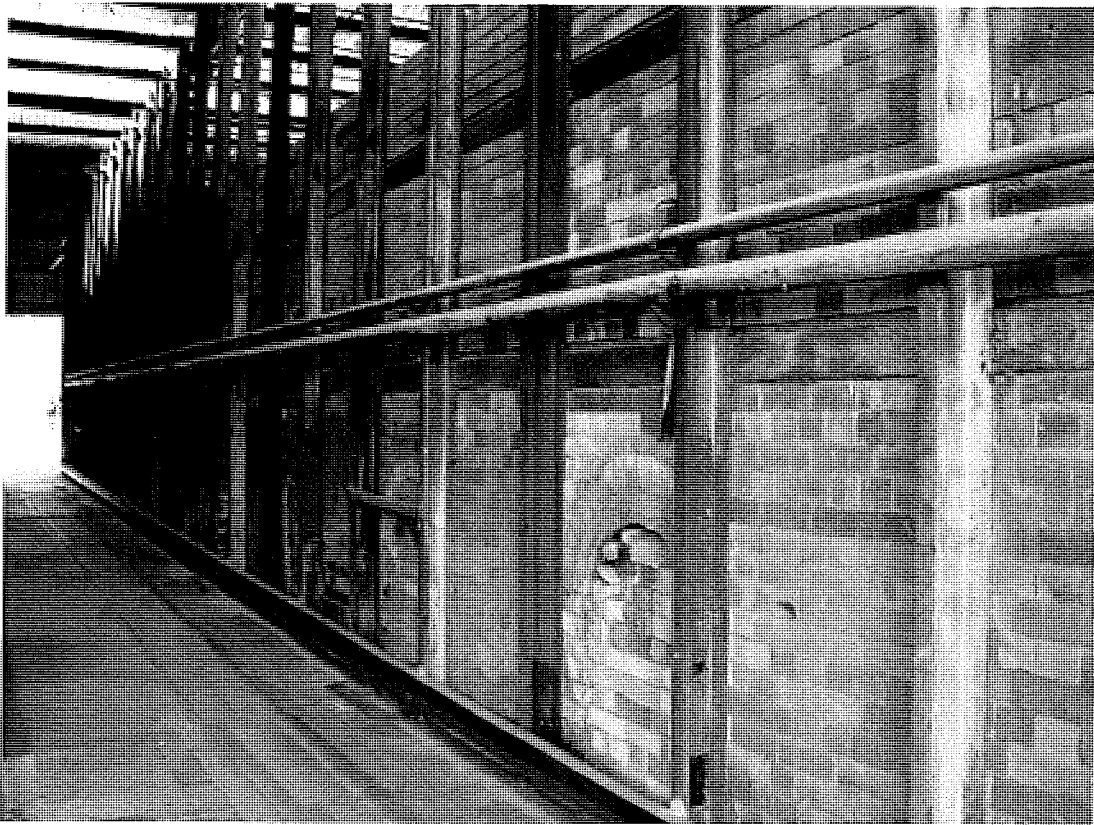


Figure 138 Side elevation showing steel framing and fireholes.

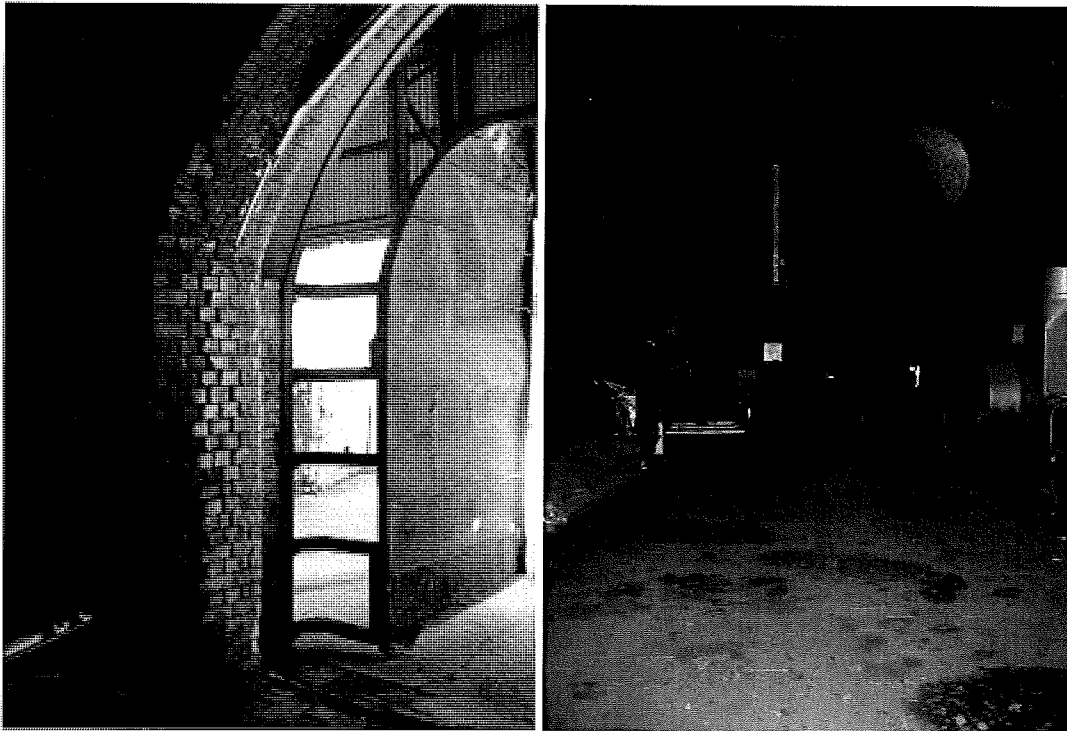


Figure 139 From left: interior of kiln showing entry and deteriorating fire bricks; interior of kiln showing later cement paving.

Historical background

A series of three downdraught kilns, also known as dome kilns, were built in the early 1960s. Initially coal-fired; they were subsequently converted to oil-firing. The kilns were used almost exclusively for the production of face and special bricks.

The kilns were constructed close to the site of two 'temporary' downdraught kilns with a brick stack (see Figure 134), which had been built in 1925 to cope with the increasing demands for Canberra's growth after the decision of the Hughes government to pursue the construction of the National Capital after World War I. These temporary kilns were demolished around in c. 1958.

Description & Integrity

The three kilns are oriented north-south and are constructed of face brick laid in an English bond and fitted with large fire brick faced metal doors to either end. There are feedholes along both the east and west sides, for the ingress of fuel, in this case coal, and later oil, each of which is topped with a segmented brick arch and infilled with brickwork. Each kiln is enclosed by steel framing which extends above each of the kilns, and reinforced by a system of tensioned tie rods. The kilns in section have a stepped profile, with the domed roof surface enclosed to the east and west sides by a traversable brick pier. The kilns are numbered 1 through 3 from east to west, with 1 being closest to the Power House (Building 3).

Internally, the kilns are designed to be accessed via metal doors to either end. None of the three kilns are accessible from the north end. With the exception of Kiln 1, the doors to the south end comprise metal cladding to the exterior face and a wall of firebricks, held in place to the surface of the metal door by a heavy duty metal mesh. These are in reasonable condition albeit some of the brick is friable and deteriorating. The doors to Kiln 1 are of metal without the firebrick lining. The doors are fitted with easy clean hinges, enabling them to be folded fully back flat against the kiln wall to permit access to the interior. Internally the north doors are either bricked over or, as for Kiln 1, a false stud wall with plaster has been installed.

The three kilns have each been altered internally to serve as antique market stalls or storage areas in the period immediately following on from the closure and relocation of the brickworks in 1976. Works typically involved the paving of the interior floors with brick, the installation of electric wiring and of lighting –generally in the form of spotlights which have reused the hot air off-takes, or suspended fluorescent fittings. Between the three kilns, racks have been installed by the current site tenant for the storage of salvaged timber. A secure display space has been created to the east of the Kiln1, within the form of the open-sided corrugated steel roof structure. It is a metal framed corrugated steel enclosure with corrugated laserlite let into the east wall.

The whole is enclosed by an open-sided metal framed corrugated steel canopy. The date of construction of this has not been confirmed, however it is thought to be contemporary with the kilns themselves. The structure appears on the 1976 aerial photograph. The roof cladding has been replaced by the current site tenant since the 1986 report was compiled.

Name	Downdraught Kiln control room	Reference No	23
Construction	Brick, corrugated asbestos cement sheet	Survey Date	3 December 2009
Historical Phase	Post-war phase 1944-1976	Date	c. 1961



Figure 140 The downdraught kiln control room is the cream brick building adjoining the larger terracotta-tiled Power House (Building 3).

Historical background

The downdraught kiln control room was constructed during the early 1960s, at the time of the construction of the three downdraught kilns (Building 22).

Description & Integrity

The control room is constructed of cream brick with a gable roof of corrugated asbestos cement. There are timber framed louvre windows to both the south and west which have been broken and are now boarded over internally with plywood. There is a brick stair with concrete treads to the west elevation, leading to the entry in the north elevation. The building is in poor condition and there are holes in the roof. The lining boards to the gable to the south are damaged.

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Name	Chimney Stack for Downdraught Kilns	Reference No	24
Construction	Brick	Survey Date	3 December 2009
Historical Phase	Post-war phase 1944-1976	Date	c.1961



Figure 141 Chimney stack viewed from the north-west.

Historical background

The brick chimney stack located north-west of the three early 1960s downdraught kilns was linked by underground tunnels from the three kilns to a now-demolished fan house. The large opening in the east face of the stack is thought to for a large duct – now removed – from the fan house. The method of operation is thought to have been similar to that of the fan house and stack associated with the Hardy patent kiln.

There is no obvious evidence of the fan house today and at the time of inspection.

Description & Integrity

The chimney stack, constructed of red brick, is located approximately 30 metres south of the draught kilns. The stack is surrounded by a gravelled car parking area and with timbers stored at its base. The design of the stack is a simpler version of the Staffordshire and Hardy patent kiln stacks, without the corbelled brickwork. At the time of the compilation of the 1986 *Conservation Plan*, the stack was being used as an incinerator by the site's tenants.

There is evidence of brickwork spalling, particularly to the west and north faces. There is a large oblong opening approximately three metres above the ground in the north face, indicating where a duct channelled spent fuel and heat to the stack for dispersal. There is an opening at low level in the south face, set within a steel door surround – the door is missing.

Name	Toilet Block	Reference No	25
Construction	Brick, steel roof decking	Survey Date	3 December 2009
Historical Phase	Post-war phase 1944-1976	Date	c. 1960s



Figure 142 The toilet facility is indicated by the arrow.

Historical background

This small brick toilet adjoins the rear of the former office building (Building 7) and is sited adjacent to a storage building (Building 31). It is similar in size and uses similar materials to the amenities block which adjoined the brick extrusion plant at the other side of the works. It contained a toilet cubicle and at time of the 1986 *Conservation Plan* it was utilised by the tenants of the former office building.

Its construction of vari-coloured brickwork suggests it was built from materials at hand, as needs dictated.

Description & Integrity

The toilet is constructed of vari-coloured brickwork, and has a skillion roof of metal roof decking. There is a window in the north wall and a door (boarded up) in the east elevation. The interior of the building was not inspected as access was not available.

The building is in poor condition.

Name	Amenities Block	Reference No	26
Construction	Brick, metal roof decking	Survey Date	3 December 2009
Historical Phase	Post-war phase 1944-1976	Date	c. 1960s



Figure 143 From left: the amenities block is the small red brick building at right; entry.

Historical background

This small brick amenities block is sited at the eastern edge of the brick extrusion plant (Building 30). It adjoins a small tan brick ancillary storage building (Building 29) which it predates. It is similar in size and is constructed of similar materials to the storage shed (Building 32) on the southern edge of the quarry, behind the White Pan Room (Building 19). It contained a toilet cubicle and shower recess and may also have functioned as a laundry, post-closure of the brickworks. At the time of the 1986 report it was utilised by the tenants of the former substation/control room and boiler house (Buildings 27 and 28 respectively).

Its construction of vari-coloured brickwork suggests it was built from materials at hand, as needs dictated.

Description & Integrity

The amenities block is of vari-coloured brickwork, and has a skillion roof of metal roof decking. Internally it has a concrete floor and there are window openings to the north, east and south. The entry is from the south. The interior has been heavily vandalised with all fittings and finishes in poor condition.

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Name	Substation/control room	Reference No	27
Construction	Brick, corrugated galvanised steel	Survey Date	3 December 2009
Historical Phase	Post-war phase 1944-1976	Date	c. 1971



Figure 144 Substation/control room building, showing north elevation.



Figure 145 The former boiler house and adjoining substation/control room, photographed from the site of the former extrusion plant. The substation building is at left.

Historical background

During 1971 a new building was constructed to house the new extrusion brick making plant as well as a series of brick drying kilns. The extrusion plant was connected to the machine shed complex at the east side of the site by an overhead conveyor which passed between the Staffordshire and downdraught kilns Buildings 4 and 22 respectively. The *Canberra Times* reported in August 1972 that the \$500,000.00 extrusion machine raised the Brickworks total production capacity from around 20 million bricks per year to more than 40 million per year.¹¹⁶

To service the new plant, the subject building – originally constructed as a substation/control room – and the adjoining boiler house (Building 28) were erected. After the closure of the plant, both buildings were refitted to serve as stalls as part of a larger antique market which operated from the site during the late 1970s-early 1980s.

Description & Integrity

The former substation/control room building is sited to the north of the boiler room, and is positioned at right angles to it.

The building is constructed of brick and has a gabled roof form clad in corrugated steel. The gable is also infilled with corrugated steel to both the front and rear. The structure is accessed by a steel roller door in the east elevation, and there is a crude corrugated steel canopy above the roller door entry in supported on timber posts with angled brackets. The verandah element extends further to the south than the extent of the building, almost abutting the verandah of the adjoining boiler house. This last element is thought to date from the use of the building as an antique stall. A painted timber sign fixed to the building's façade adjoining the louvre window next to the roller door reads 'Nicky's Antiques'. There is a single door entry in the north elevation and a window, with metal bars fixed to its outside face. The door is a painted timber ledged door set within a timber frame. A metal cable tray which previously extended from the rear (west) wall into the extrusion plant proper has been crushed against the wall.

The building is of painted brickwork internally, has a concrete floor and painted concrete ceiling. The space is largely stripped out, and at the time of inspection a number of rusted metal brick barrows were *in-situ*.

The building is in fair condition, apart from the impacts of minor vandalism, including the breaking of windows, painted graffiti and smoke damage. The corrugated galvanised steel roofing is in very good condition.

The verandah element and signage date from the post-closure phase and are related to its subsequent use as an antique stall.

¹¹⁶ Cited in Lester Firth and Associates, 1986, datasheet DH.

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Name	Boiler House	Reference No	28
Construction	Brick, corrugated galvanised steel	Survey Date	3 December 2009
Historical Phase	Post-war phase 1944-1976	Date	c. 1971

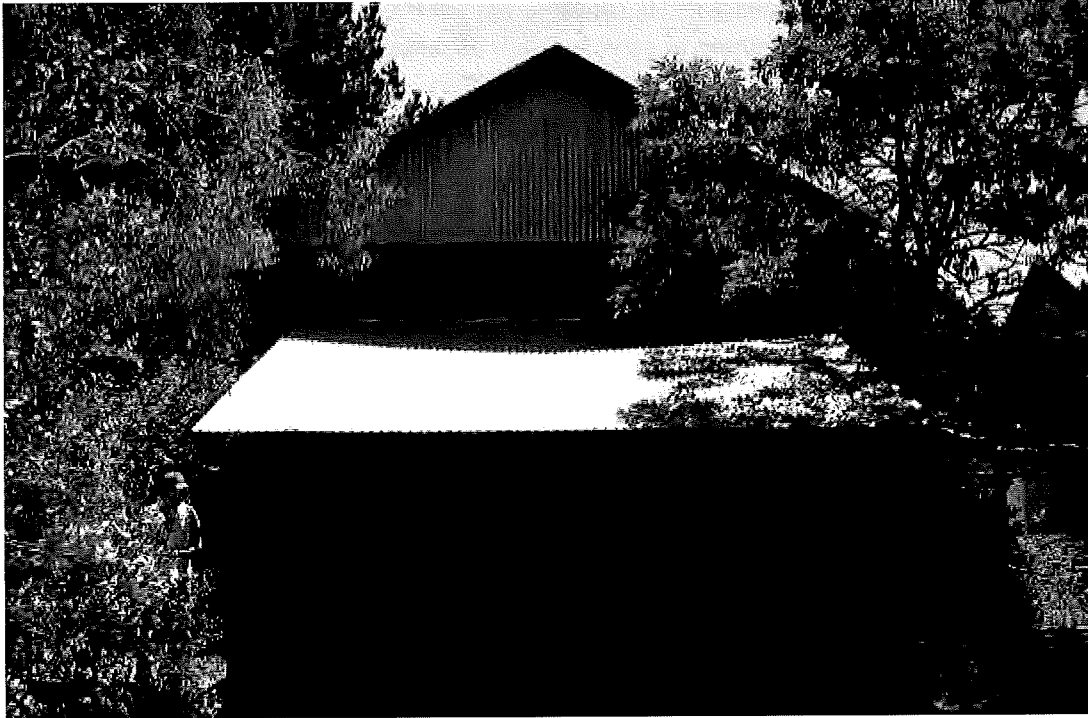


Figure 146 Former boiler house building showing east entry and later verandah addition.



Figure 147 The former boiler house and adjoining substation/control room, viewed from the site of the former extrusion plant. The boiler house is at right.

Historical background

During 1971 a new building was constructed to house the extrusion brick making plant as well as a series of brick drying kilns. The extrusion plant was connected to the machine shed complex at the east side of the site by an overhead conveyor which passed between the Staffordshire and downdraught kilns. The *Canberra Times* reported in August 1972 that the \$500,000.00 extrusion machine raised the Brickworks total production capacity from around 20 million bricks per year to more than 40 million per year.¹¹⁷

To service the new plant, the subject building – originally constructed as a boiler house – and the adjoining substation/control room (Building 27) were erected. After the closure of the plant, both buildings were refitted to serve as stalls as part of a larger antique market which operated from the site during the late 1970s-early 1980s.

Description & Integrity

The former boiler house is a double-height structure, constructed of brick and has a gabled roof form clad in corrugated steel. The gable is also infilled with corrugated steel to both the front and rear. The structure is accessed by a steel roller door. There is a crude corrugated steel canopy above the roller door entry in the east elevation, supported on timber posts. This last element is thought to date from the use of the building as an antique stall. There is a crudely laid brick and concrete paver apron to the entry.

The building is of painted brickwork internally, and has a concrete floor and painted ceiling lining boards with a narrow bead. There are two fixed pane windows to the east and west walls, approximately 2.5 metres above the internal floor level. No machinery or equipment relating to its original use remains.

The building is in good condition, apart from the impacts of minor vandalism, including the breaking of windows.

The verandah element is thought to date from the post-closure phase and related to its subsequent use as an antique stall.

¹¹⁷ Cited in Lester Firth and Associates, 1986, datasheet DH.

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Name	Ancillary storage building	Reference No	29
Construction	Brick, corrugated galvanised steel	Survey Date	3 December 2009
Historical Phase	Post-war phase 1944-1976	Date	c. 1971



Figure 148 The storage building, adjoining the site of the brick extrusion plant site.

Historical background

This is a small structure located on the edge of the brick extrusion plant site, and its date of construction is thought to be contemporary or soon after the construction of this facility c. 1971. Its original function is not known. At the time of the 1986 *Conservation Plan* it was in use as a studio space by an artist/craftsperson. At present it is vacant and unsecured.

Description & Integrity

The building is constructed of tan wire-cut brick, and has a skillion roof of metal roof decking. Internally it has a concrete floor and window openings to both the south and east elevations. There is a doorway in the east elevation. The glazing and window framing as well as the door have been removed. Internally the building has a concrete floor and the walls are partly of painted brickwork with some areas of painted wall lining panels. The ceiling is also lined and painted.

The building is vacant and in poor condition.

Name	Slab for Brick Extrusion Plant	Reference No	30
Construction	Concrete slab	Survey Date	3 December 2009
Historical Phase	Post-war phase 1944-1976	Date	c. 1971



Figure 149 Detail of a 1976 aerial photograph showing the extrusion plant and overhead conveyor (Indicated).
 Source: ACT Heritage Library, Woden ACT.

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Figure 150 Brick extrusion plant site, looking north-east.

Historical background

During 1971, a new building was constructed to house the extrusion brick making plant as well as a series of brick drying kilns. The extrusion plant was connected to the machine shed complex at the east side of the site by an overhead conveyor which passed between the Staffordshire and Downdraught kilns. This is shown in an aerial photograph of the brickworks site, taken in May 1976. The *Canberra Times* reported in August 1972 that the \$0.5 million extrusion machine raised the total production capacity of the plant from c. 20 million bricks per year to over 40 million per year.

After the closure of the brickworks the shed building which enclosed the drying kilns and brick making machinery was relocated to the Canberra Showgrounds and the conveyor was dismantled. Since the compilation of the 1986 report the drying kilns have also been demolished. The slab is now used as a timber store.

Description & Integrity

The concrete floor slab is the remaining element of the short-lived extrusion plant. Buildings 27 and 28 – the substation/control room and boiler house respectively which abut the site to the south-east - were constructed to service the extrusion plant.

Name	Ancillary storage building	Reference No	31
Construction	Brick, corrugated galvanised steel	Survey Date	3 December 2009
Historical Phase	Post-war phase 1944-1976	Date	c. 1960s



Figure 151 The ancillary storage building is sited behind the former offices (Building 7).

Historical background

This small brick storage building abuts a brick toilet (Building 25) behind the former office building (Building 7). It uses similar materials to the storage shed which adjoins the White Pan Room (Building 19), further to the north. It appears to have been built as a store, related to the nearby office building.

Description & Integrity

The structure is of orange face brick with a timber framed door and window to the south elevation. It has a skillion roof of metal roof decking. The interior walls are lined and part-fitted with shelving unit brackets. The building is unsecured, vandalized and in poor condition.

Name	Storage shed	Reference No	32
Construction	Brick, corrugated galvanised steel	Survey Date	3 December 2009
Historical Phase	Post-war phase 1944-1976	Date	c. 1960s

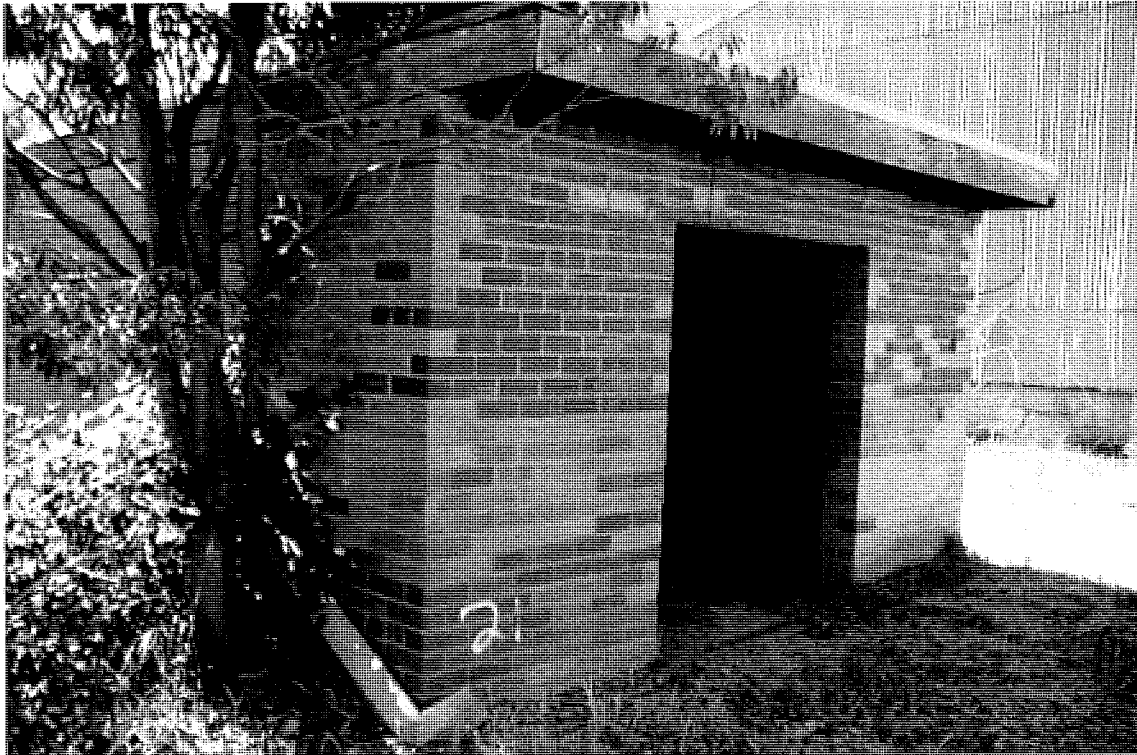


Figure 152 Storage shed.

Historical background

This small brick storage shed is sited on the southern edge of the quarry, and behind the White Pan Room (Building 19). It is similar in size and uses similar materials to the toilet and storage building behind the office building, further south and the amenities block adjacent to the brick extrusion plant. The original function of the shed is not known. Its construction of vari-coloured brickwork suggests it was built from materials at hand, as needs dictated.

Description & Integrity

The shed is of vari-coloured brickwork, and has a skillion roof of metal roof decking. Internally it has a concrete floor and the timber door to the large opening on its north face is stored within the building. The walls are not lined internally and the reflective insulation has been damaged by vandals. The shed is vacant and in fair condition.

6.0 HISTORY & PHYSICAL ANALYSIS: POST CLOSURE PHASE 1976-2010

6.1 Introduction

The following section summarises the uses, and some of the proposed uses, of the Canberra Brickworks since the site was decommissioned in 1976. As noted at Chapter 1, the site is presently occupied by a recycled timber merchant and a number of artists.

6.1.1 A.R. Marr redevelopment proposals (1976-84)

In September 1976 all removable structures at the Canberra Brickworks were offered 'for sale for removal,' and the extrusion plant shed to the south-west of the site was relocated to the Canberra Showgrounds.¹ The National Capital Development Commission (NCDC) anticipated that costs incurred during the relocation process would be recovered during the subsequent adaptive re-use of the site, which the NCDC initially proposed to achieve by redeveloping the site with medium density housing.²

Also in 1976, local developer and businessman Alan Marr (A R Marr Pty Ltd) put forward a proposal to develop the brickworks as an integrated tourist, recreation and retail centre. Uses envisaged included manufacturing (including a pottery, winery and crafts), speciality shops, an antiques market, plant nursery, restaurant and tavern, offices, art displays (in the upper levels of the three continuous kilns) and museums, including collections of vintage cars and fire engines. Medium density housing was proposed to the east and north of the site. Under Marr's scheme, the quarry was to be landscaped to include picnic areas, walking trails and a miniature railway.³ Marr succeeded in having the land re-zoned to accommodate his vision for a mixed-use tourism, recreation and residential development. The present zoning at the site dates from this period.⁴

Works undertaken by Marr on the existing buildings included re-roofing the Staffordshire and draught kilns; re-constructing the external brick walls of the Staffordshire kiln; some internal lining to the Staffordshire kiln; electrical work to the Hardy patent kilns; paving to some areas of the Hardy patent kilns; and re-roofing of ancillary buildings.⁵ Work on the quarry commenced towards the end of 1978, including land fill and the creation of the reflection lake (see Figure 153).

The redeveloped brickworks was opened to the public as a tourist attraction in July 1979. However, limited income opportunities and high capital costs (over \$1 million was invested in works to the site⁶), forced A R Marr into provisional liquidation.⁷ Auctions of the vintage car

1 Lester Firth and Associates, 1986, Section 2.1.5, sources uncited.

2 'Proposed Land Uses for Undeveloped Land in Inner Canberra,' National Capital Development Committee, cited in Lester Firth and Associates, 1986, Section 2.1.5.

3 Lester Firth and Associates, 1986, Section 2.1.5.

4 Connell Wagner Pty Ltd, *The Old Canberra Brickworks and Environs Development Control Plan*, February 2001, p. 4.

5 Lester Firth and Associates, 1986, Section 2.1.5.

6 Lester Firth and Associates, 1986, Section 2.1.5, uncited reference.

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collection and site equipment took place in September and November 1980. Two of the items, a 1913 Austral Otis Steam Roller and a 1925 Fowler Road locomotive, both associated with Canberra's early development, were purchased for the National Museum of Australia.⁸

At this time Marr also held an option to develop up to 212 townhouses on parts of the brickworks site. In 1980 the first stage, comprising 20 houses on the eastern side of the site, was commenced. Work on houses to the north of the brickworks (now Lane Poole Place) began the following year.⁹

In the early 1980s, Alan Marr was seriously injured in a fall at the brickworks, and later died of complications.¹⁰ On 18 September 1984, the Commonwealth accepted surrender of A R Marr Pty Ltd's lease and paid \$1.1 million for the lessee's interest in the site.¹¹ The surrender included options to acquire adjoining land for the construction of 151 townhouses. The Commonwealth paid the lessee \$1.1 million for its interests.¹²

A number of tenants from the Marr lease, including artists, the antiques market and a timber recycling merchant, Thor's Hammer, remained at the site. In the mid-1990s, due to concerns about the safety of some of the buildings¹³ and in anticipation that the site was going to be redeveloped (see below), the tenants were required to leave. The role of the caretaker (Bruce McDonald), who had been responsible for the management of the site since the Marr lease, was also abolished. In recognition of the considerable volume of its timber stock, Thor's Hammer was granted an extended period to relocate. The company was still at the site by the time it was clear that the development proposal was not going to come to fruition. Thor's Hammer remains at the site today.

6.1.2 Hooker projects proposal (1988)

In February 1979, the NCDC issued the *Yarralumla Policy Plan: Report on Environmental Issues Incorporating Draft EIS and the Development of Section 100 Yarralumla*. This document was, 'intended to provide additional demands for housing, recreation, tourism and national capital uses which were deemed compatible with the existing use and character of Yarralumla.'¹⁴ The recommendations of the *Yarralumla Policy Plan* were poorly received by

7 A R Marr Pty Ltd was put into provisional liquidation on 9 January 1980. Lester Firth and Associates, 1986, Section 2.1.5.

8 Lester Firth and Associates, 1986, Section 2.1.5.

9 Lester Firth and Associates, 1986, Section 2.1.5.

10 Pers comm., Peter Vandermark (artist based at the Canberra Brickworks) and Adam Mornement, Lovell Chen, 4 December 2009.

11 Susan Conroy & Munns Sly Architects, *The Yarralumla Brickworks & Environs Planning Review*, March 2005, pp. 21-22, and Lester Firth and Associates, 1986, Section 2.1.5.

12 Lester Firth and Associates, 1986, Section 2.1.5.

13 A brick is rumored to have fallen from the ceiling of one of the downdraught kilns. Pers comm., Thor Diesondorf, Thor's Hammer and Adam Mornement, Lovell Chen, 4 December 2009.

14 Susan Conroy & Munns Sly Architects, *The Yarralumla Brickworks & Environs Planning Review*, March 2005, p. 21.

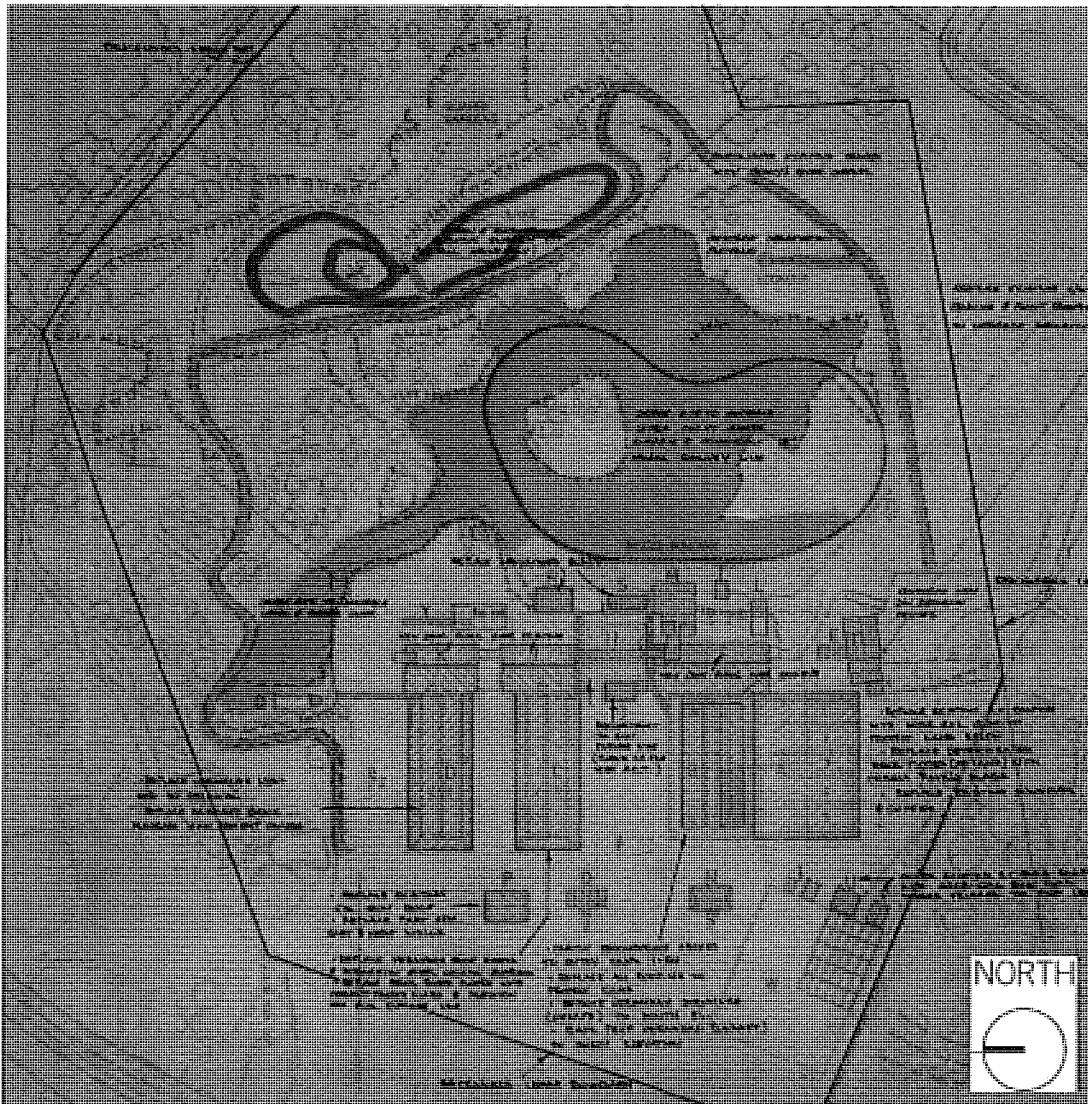


Figure 153 The A R Marr proposed for Canberra Brickworks, c. 1977.
 Source: ACT Heritage Library, Woden ACT.

the local community, with objections relating to the loss of open space, the scale of the tourism and recreation development and medium density development.¹⁵

The *Yarralumla Policy Plan* (1979) was followed in 1988 by the *Canberra Brickworks South Canberra Policy Plan*. This document suggested a range of potential uses for the site, including:

- Medium density housing in the western and southern areas of the brickworks: c. 250 dwellings of 30 households per hectare (4.2.1);
- Commercial accommodation in some of the historic buildings at the site (4.2.1); and

¹⁵ *Yarralumla Section 94, Brickworks Redevelopment Section 2, variation no. 5* (anonymous and undated), a compilation of responses to the *Draft Yarralumla Policy Plan*, held in ACT Assembly Library, cited by Susan Conroy & Munns Sly Architects, p. 21.

- Limited amounts of office and retail space (4.2.2 and 4.2.4, respectively)

In addition, it was noted that a combination of the above uses would be appropriate in the development of the brickworks as a tourism destination, and that future uses of the site needed to be financially self-sufficient.¹⁶

Susan Conroy and Munns Sly Architects suggest that the 1988 *Policy Plan*: 'Appears to have been instigated by the Commonwealth because of what it considered an innovative plan [the Hooker proposal, described below] for redevelopment and use of the Canberra Brickworks Site [sic]'.¹⁷

Once again, the *Policy Plan* was poorly received by the community, and led to the establishment of the Yarralumla Residents Association (YRA), in November 1988. The Association took the view that the *Plan* had been hastily prepared and failed to address key issues.¹⁸

Regardless of the YRA's views, the *Plan* was adopted, and formed the basis of calls for Expressions of Interest (EOI) for the development of the site in November 1988. The preferred EOI was submitted by Hooker Projects, which proposed a sports precinct in the south and the south-west of the site, with the kilns adapted to multiple uses, including a museum, restaurant, hotel and visitor attractions. Sections of the machine bays were proposed for adaptive re-use, including the conveyor belt in the roof space as a 'museum walkway' (see Figure 154).

By 1990, however, with the economy depressed, Hookers had been placed in provisional liquidation. Susan Conroy and Munns Sly Architects note that, 'negotiations continued with the liquidator, Halwood Corporation Ltd, who transferred development rights to a subsidiary Hooker Projects (Castlereagh Management), to allow progress on the project ... [However] by August 1992, the Hookers proposal was defunct'.¹⁹

6.1.3 Local Area Planning Committee proposal (1998)

In 1998, following a failed development proposal by the Canberra Theatre,²⁰ the Burley Griffin Local Area Planning Committee (LAPAC) was invited by the Government to submit its recommendations with regard to the future development of the brickworks. The committee that developed the proposal comprised representatives of the LAPAC and Yarralumla Residents Association,²¹ with assistance from local architect Ric Butt.²²

¹⁶ NCDC, *Yarralumla Brickworks South Canberra, Policy Plan*, October 1988, pp. 14-15.

¹⁷ Susan Conroy & Munns Sly Architects, p. 21.

¹⁸ Susan Conroy & Munns Sly Architects, p. 22, citing a letter (December 1988) from the Yarralumla Residents Association to the Hon Clive Holding.

¹⁹ Susan Conroy & Munns Sly Architects, p. 23.

²⁰ See, Cameron Chisholm and Nicol Architects, *A Proposal for the redevelopment of the Old Canberra Brickworks*, prepared for Canberra Theatre, instructed by Allied Projects (ACT), July 1996, cited in Susan Conroy & Munns Sly Architects, p. 23.

²¹ Connell Wagner Pty Ltd, 2001, p. 5

²² Susan Conroy & Munns Sly Architects, p. 23.

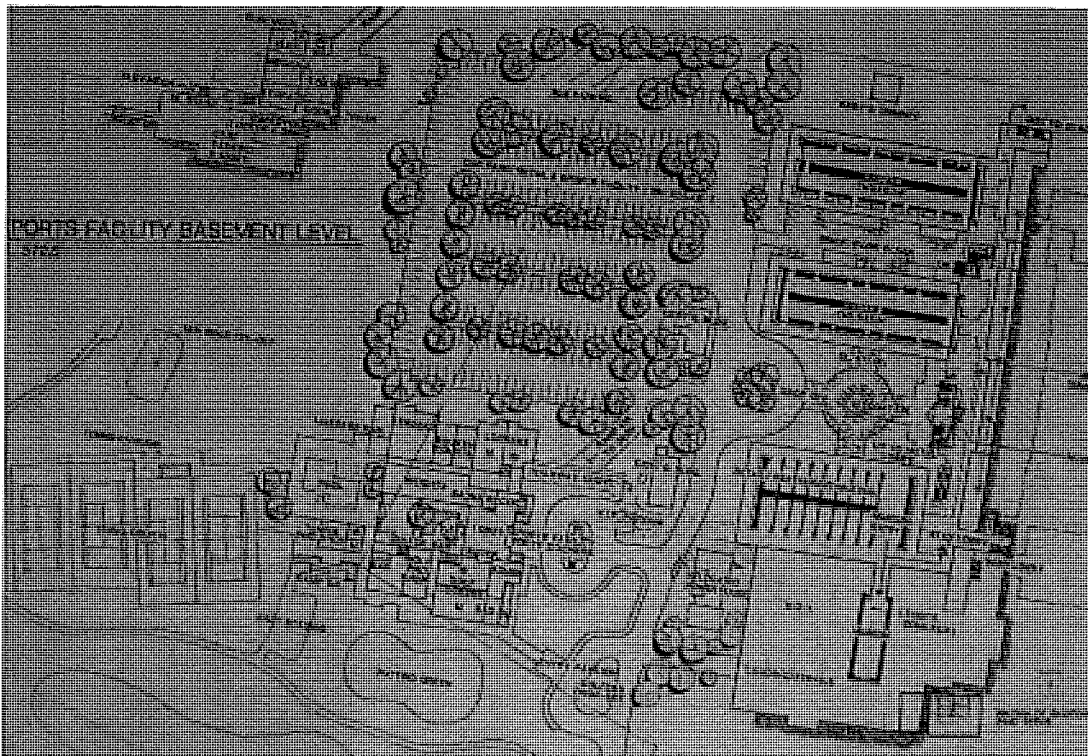


Figure 154 Ground level plan of Hooker Project's proposal for the Canberra Brickworks, 25 November 1988. North is at top.

Source: ACT Heritage Library, Woden ACT.

The LAPAC scheme recommended that, following stabilization, the brickworks should be retained as a ruin and that the site should be developed as an industrial archaeology park with a heritage centre and public gardens. Other uses included low intensity commercial uses (such as markets and performance venues between kilns), and 'landscape buffers linking to surrounding recreation and open space'.²³ Mixed residential and commercial areas, including limited manufacturing, were proposed for sites adjacent to the brickworks. In these areas, housing density was proposed at c.15 dwellings per hectare. On this basis, the LAPAC anticipated a total of c. 100 dwellings.

The ACT's planning body (PALM) subsequently worked with the local community on the development of the site based on the LAPAC recommendations.²⁴ The LAPAC proposal also formed the basis of the *Brief for a Development Control Plan (DCP)*²⁵ for the Canberra Brickworks and surrounding un-leased land which was initiated in 2000 by Office of

²³ Susan Conroy & Munns Sly Architects, p. 24.

²⁴ Connell Wagner Pty Ltd, 2001, p. 5. See also, PALM, *Expressions of Interest Old Canberra Brickworks* (Blocks 1, 7, 20, Section 102, Yarralumla (undated), c. 1997), cited in Susan Conroy & Munns Sly Architects, p. 24.

²⁵ Connell Wagner Pty Ltd, 2001, p. 5, and Susan Conroy & Munns Sly Architects, p. 24.

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Infrastructure and Asset Management. Connell Wagner was commissioned to prepare the DCP.²⁶

Options identified by the DCP included the development of the site for housing; the creation of fenced gardens in the former quarry; adaptive re-use of the brickworks, dependent on remediation; the potential for adaptive re-use for aged care accommodation; and leaving the site substantially undeveloped.²⁷

The YRA responded to the DCP with a recommendation that a maximum of 25 units be developed, to the south of the brickworks. As noted by Susan Conroy and Munns Sly Architects, the YRA also proposed that the Defense Housing Authority develop and manage the site. The ACT Government entertained the proposal, but concluded that any development should be based on a competitive process for land sales.²⁸

In May 2002 the ACT Land and Property Group engaged a firm of civil consultants to evaluate the YRA's 25 dwelling proposal, including costings and consideration of an access road from Dudley Street to the south.²⁹

26 Connell Wagner Pty Ltd, *The Old Canberra Brickworks and Environs Development Control Plan*, February 2001.

27 Connell Wagner Pty Ltd, 2001, chapters 6 and 7.

28 Susan Conroy & Munns Sly Architects, pp. 24-25. .

29 Ribeny F J & Associates, *Multi-Unit Site, The Old Canberra Brickworks Yarralumla DUS*, 26/05/02, cited by Susan Conroy & Munns Sly Architects.

6.2 Datasheets for Post-closure phase elements

No.	Name/Description	Date of construction
33	Model railway workshop	c. 1979
34	Model railway storage shed	c. 1979



Figure 155 Location of elements surviving from the Post-closure Phase. Refer to the larger scale site plan in Chapter 1 for more detail.

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Name	Model Railway Workshop	Reference No	33
Construction	Brick, corrugated galvanised steel	Survey Date	3 December 2009
Historical Phase	Post-closure phase 1976-2009	Date	c. 1979

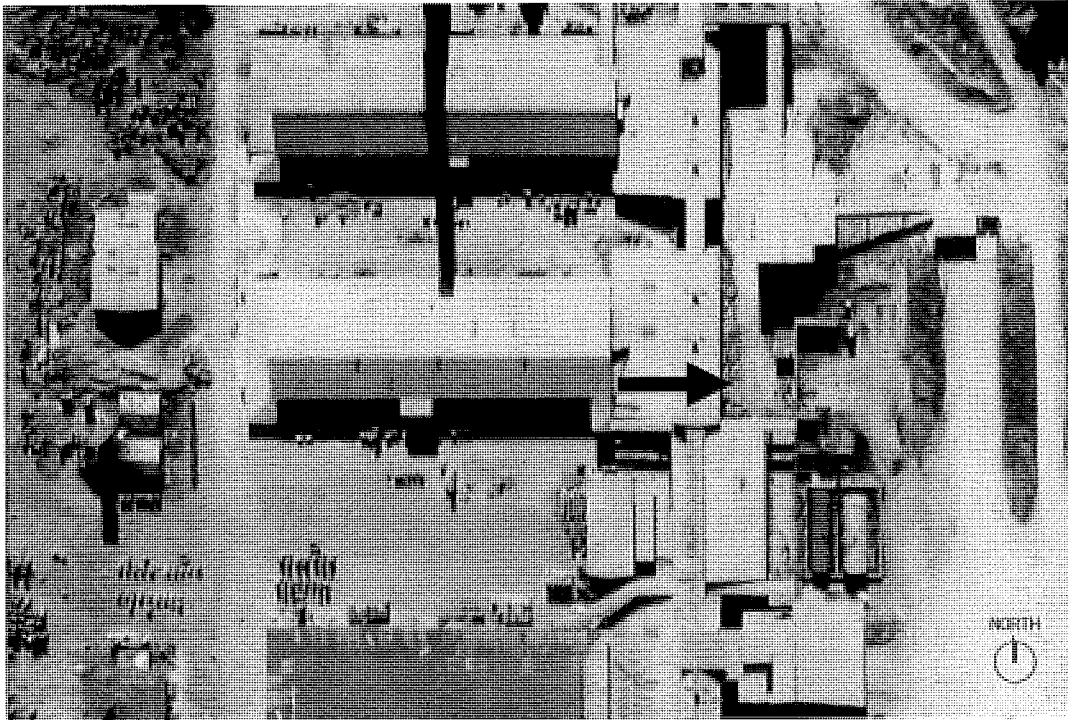


Figure 156 Detail of a 1976 aerial photograph, with the brick component of Building 33 – at that time a storage bunker - indicated.
 Source: ACT Heritage Library, Woden ACT.

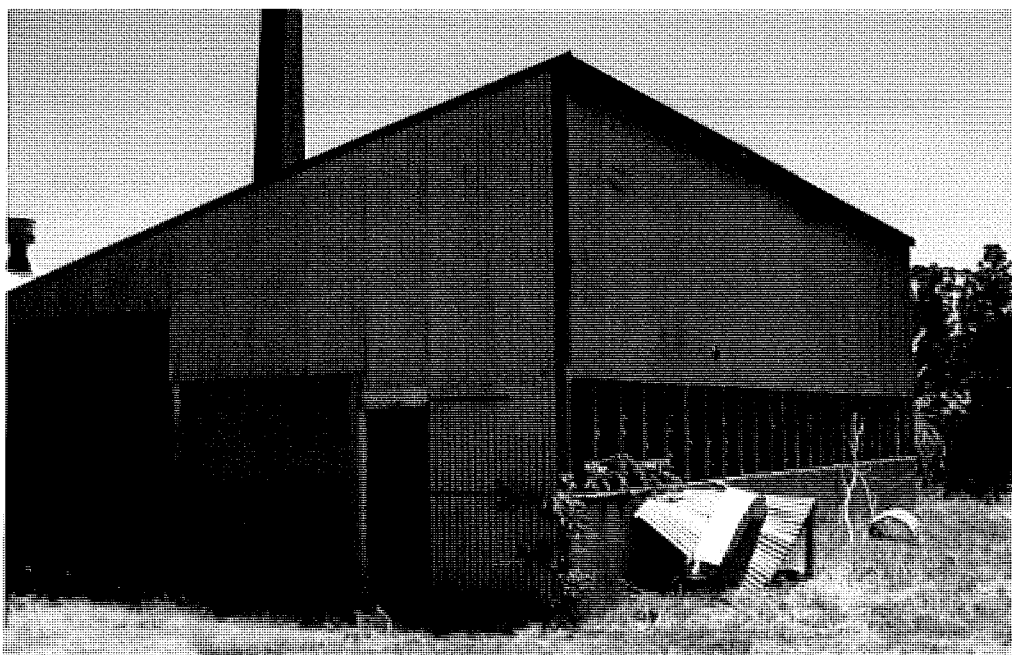


Figure 157 Exterior, showing the south and east elevations. The brick wall is an earlier element incorporated into the workshop building.

Historical background

Similar to the model railway storage shed (Building 34), the model railway workshop was constructed in 1979, utilizing the brick walls of a former oil storage facility /coal storage bay, associated with the brickworks (see Figure 156). The workshop relates to the post-closure phase and housed an engine and carriages for a narrow gauge railway, which was established as part of A R Marr Pty Ltd's operation of the site. A site plan prepared in the 1970s showing works relating to the proposed reuse of the site outlines the sites of both Building 33 and 34 and annotates the drawing 'replace demolished buildings'.³⁰

Description & Integrity

Located to the west of the quarry, the shed is a steel framed skillion-roofed structure, clad in corrugated galvanised steel. To the west, north and south the building incorporates the brick walls of a former fuel storage facility or coal bay. The structure abuts a deep excavation to its west, and the brick wall to the north and west is atop a concrete retaining wall to the lower (brickworks) level. It has a row of windows (louvred glazing all broken/removed) running along the northern wall looking out onto the quarry. There is a roller door entry and a single door entry to the south elevation.

Internally the corrugated galvanised steel walls are lined, with much of the lining panels damaged and the brick is not lined. The floor is of concrete and the roof is not lined.

³⁰ Site plan held in the collection of the ACT Heritage Library, Woden ACT.

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Name	Model Railway storage shed	Reference No	34
Construction	Corrugated galvanised steel on brick plinth	Survey Date	3 December 2009
Historical Phase	Post-closure phase 1976-2009	Date	c. 1979



Figure 158 Detail of a 1976 aerial photograph, with the site of Building 34 – at that time an oil storage facility - indicated.
Source: ACT Heritage Library.

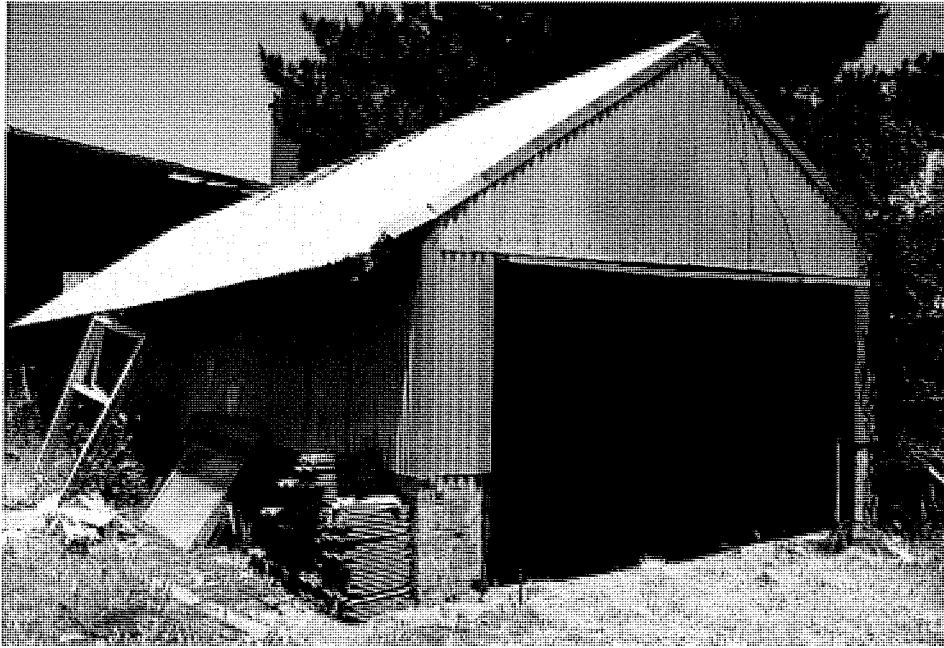


Figure 159 Exterior, showing east and north elevations.

Historical background

The storage shed was constructed in 1979, utilizing the brick footings and dwarf walls of a former oil storage facility /coal storage bay, associated with the brickworks, and shown on the 1976 aerial photograph containing two storage tanks (see Figure 158). It is an element relating to the post-closure phase and housed an engine and carriages for a narrow gauge railway which formed part of A R Marr Pty Ltd's operation of the site. A site plan prepared in the 1970s showing works relating to the proposed reuse of the site outlines the sites of both Building 33 and 34 and annotates the drawing 'replace demolished buildings'.³¹

Description & Integrity

The storage shed is of steel frame construction over an earlier brick base and is similar in scale to a domestic garage with corrugated galvanised steel cladding on the walls and roof. It has a tilt-up metal garage door and is presently used for timber storage. It is in good condition.

³¹ Site plan held in the collection of the ACT Heritage Library, Woden ACT.

6.3 Demolished structures

The 1986 *Conservation Plan* provides background information, with varying degrees of detail, on a number of structures associated with the development of the brickworks. As well as a number of structures relating to the establishment phase of site, it is noted that there were also structures relating to the post-war phase of development. These include a clay storage shed, carpenter's workshop, oil and coal bunkers, weighbridge and a forklift shed, demolished since the 1986 *Conservation Plan*. They are described briefly below. While the significance of these later demolished structures is considered to be relatively limited, they should be investigated as part of a broader archaeological assessment of the site and abutting land. Refer to Chapter 8.



Figure 160 Aerial photograph, 1976, with the following later site elements indicated; clay storage shed (red star); coal storage bunker (red/green star) and former forklift shed (red/yellow star).

Source: ACT Heritage Library, Woden.

6.3.1 Clay storage shed

The storage shed was located within the quarry area to the immediate east of the brickworks. It stored clay, bought to the site by trucks prior to crushing. It is visible in 1976 aerial photograph of the site (see Figure 160).

6.3.2 Coal storage bunker

The coal storage bunker was located on an elevated site to the north of the Hardy patent kiln II chimney stack (Building 13), as indicated at Figure 160. The site today forms part of the Lane Poole Place housing complex and is outside the study area.

6.3.3 Former forklift shed

The forklift shed was extant at the time of the compilation of the 1986 *Conservation Plan*. The building was constructed in c. 1965 to house forklifts and replaced an earlier shed structure. The forklift shed was a brick structure with a corrugated galvanised steel roof. The structure contained a petrol bowser linked to a large underground tank sited between the shed and the fan house associated with the Hardy patent kiln I (Building 9). The description of the building provided in the 1986 *Conservation Plan* noted that it was in poor condition. The site of the building today is overgrown with little evidence of its form, apart from some remnant brickwork and rubble (Figure 161). As noted, the structure replaced an earlier shed building, the date or purpose of which is not known.

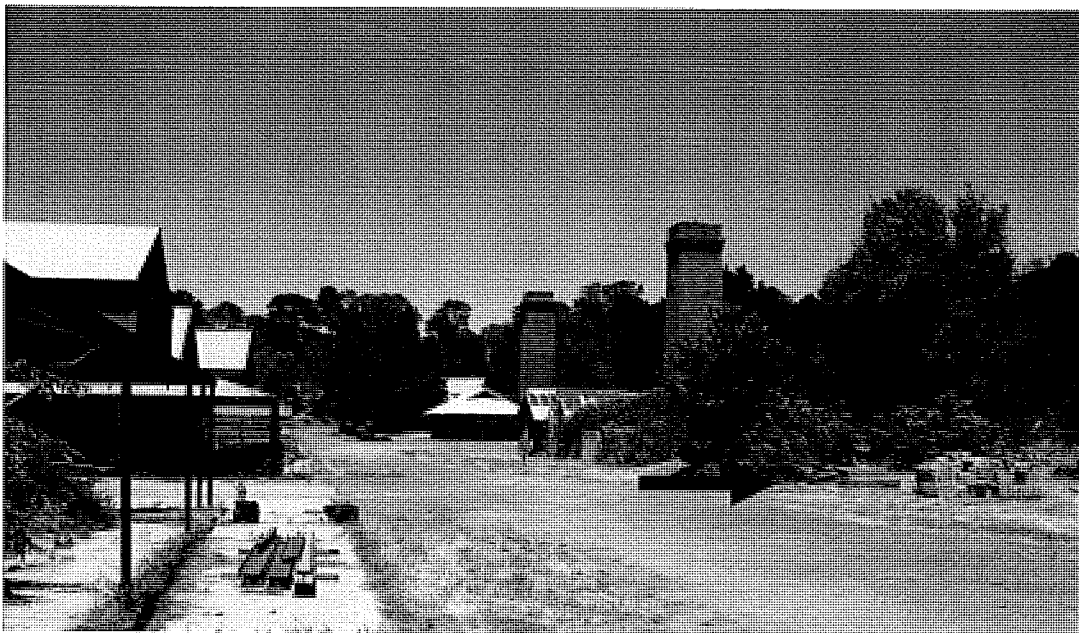


Figure 161 The approximate site of the former forklift shed indicated by the arrow.

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7.0 ASSESSMENT OF SIGNIFICANCE

7.1 Introduction

The following assessment of cultural heritage significance for the Canberra Brickworks includes:

- a comparative analysis of related urban brickworks sites;
- an assessment of the historical and technological values of the site as an evolved brickmaking complex of the early to mid /late twentieth century;
- an assessment of the site in the context of the establishment and early history of the Australian Capital Territory (ACT) and the national capital (Canberra);
- a description of the identified scientific (geological) values of the place;
- an assessment of the aesthetic values of the place;
- a consideration of the issue of social values that may attach to the place;
- an assessment of the brickworks against the ACT Heritage Significance Criteria, and the National Heritage List criteria; and
- a new Statement of Significance for the site based in part on the existing statement in the ACT Heritage Register.

7.2 Comparative analysis

7.2.1 *Late 19th and 20th century urban brickworks in Australia*

Brickworks were once a common feature of Australian urban landscapes. The introduction of continuous kilns from the 1870s saw the replacement of small-scale enterprises with larger works of which the Canberra Brickworks is an example. As noted in Chapter 2, the development of the continuous kiln marked a major shift in firing technology, enabling mechanised production on an industrial scale, and signalling the end of the era of small-scale brick manufacturers. The increased speed of the brick making process also encouraged the mechanisation of brick preparation, and improvements in related technologies and processes, including brick presses.

Brickyards with continuous Hoffman-type kilns proliferated from the late-nineteenth century to the interwar period. These yards closed progressively from the end of World War II, with further waves of closures in the mid-1960s, and in the 1980s. The majority of these sites had been demolished by the 1990s.¹⁴⁹ Today, there are no Hoffman-type or 'patent' continuous kilns in operation as originally designed in Australia (other than a single example at Bowral which has been modified to operate as a downdraught kiln).

The following section provides an overview of brickworks in major Australian cities that include, or previously included, continuous kilns. The majority of these sites are either redundant, disused or have been adapted to an alternative use. Brickworks that have been demolished in their entirety and redeveloped are not included. Every effort has been made

¹⁴⁹ Pers comm., Stephen Wall, NSW Manufacturing Manager, Austral Brick Co Ltd, and Adam Mornement, Lovell Chen, 10 February 2010.

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to confirm the currency of the information provided, however with the exception of the Victorian examples and one example in South Australia, none of the sites have been inspected as part of the review. The comparative analysis describes brickworks complexes.

It does not include potteries or facilities that produced other fired products (tiles, piles and the like). See Figure 165.

New South Wales

Goodlet and Smith Brickworks (fmr)150, Granville, Parramatta

In 1884 hardware and building supplier Goodlet and Smith acquired the Junction Brick Company Ltd at Granville, west of Sydney. Production of building products, including bricks, finials, tiles and capping, and pottery, continued at the works until 1985.¹⁵¹ Early development of the brickworks included a Hoffman kiln with a 45m-tall stack and associated technologies and support structures.¹⁵² By the early twentieth century, the brickworks had evolved to become one of the largest in the Sydney region.

In 2002, infrastructure related to brick production at the site included the Hoffman kiln, by then truncated and adapted to two long draught kilns, with an associated stack; two draught kilns; two stacks; a conveyor; brick maker's smithy; and ancillary buildings, including the old tile works.¹⁵³

These elements have been retained and integrated into the 'Brickworks Square' interpretive component of the Holroyd Gardens residential development (Delfin Lend Lease). The former quarry has been filled.

¹⁵⁰ The former Goodlet and Smith Brickworks have also been known as Junction, Merrylands and Granville brickworks.

¹⁵¹ Ron Ringer, *The Brickmasters, 1788-2008*, pp. 75-77.

¹⁵² Ron Ringer, *The Brickmasters, 1788-2008*, p. 77.

¹⁵³ Eric Martin and Associates, 'Former Goodlet & Smith Brickworks as part of the Holroyd Gardens Development: Heritage Report & Statement of Heritage Impact for the Heritage Precinct Buildings,' July 2002.



Figure 162 The Holroyd Gardens redevelopment at the former Goodlet and Smith Brickworks, pictured 2008.
Source: Flickr



Figure 163 Interpretive signage and industrial relics at the former Goodlet and Smith Brickworks, pictured 2008.
Source: Flickr.

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Bedford Brick Works (fmr), St Peter's, Sydney

The Bedford Brick Works (also known as the Josiah Gentle Brickworks) was among the largest in the St Peter's district, which was the centre of Sydney's brickmaking industry from the 1840s. The complex was established in 1893, and taken over by the Austral Brick Company in 1933. It closed in 1970.¹⁵⁴ At its height (c. 1930s), the Bedford Brick Works included two Hoffman kilns, one with curved ends and a centralised stack, the other with a squared ends and a stack attached at the south end. The later 'Hoffman' has been described as a Hardy patent kiln.¹⁵⁵ The site also included six draught kilns in two clusters, brick sheds, a site office/entry building and machine shed, with a clay pit to the north (see Figure 164).

The site has been conserved within a public open space (Sydney Park). One of the draught kilns and the west end of the Hoffman kiln with rounded ends has been demolished to accommodate a road widening scheme. The site office/entry has also been removed. The Hoffman (Hardy patent?) with squared ends, five draught kilns, a crushing mill and boiler house have been retained.¹⁵⁶

The four surviving chimney stacks at the site have a strong presence in the local streetscape (see Figure 166). The site is included in the South Sydney Amending Local Environmental Plan, 2000.

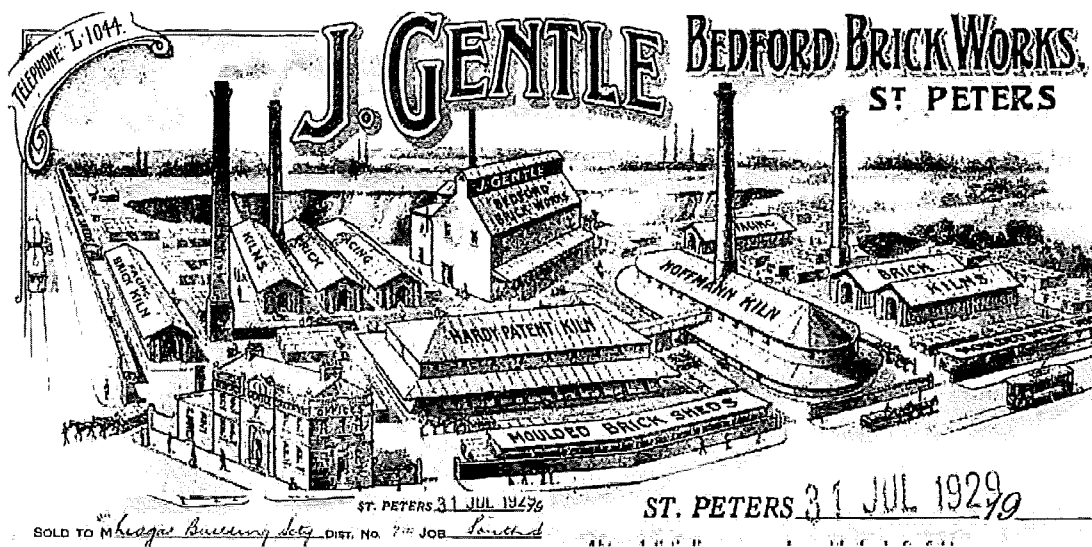


Figure 164 Letterhead for Bedford Brick Works, 1929.

Source: Ron Ringer, *The Brickmasters, 1788-2008*, p. 166.

154 Anne-Maree Whitaker, 'Sydney Park [2008]' www.dictionaryofsydney.org, accessed 15 January 2010.

155 Dictionary of Sydney online, 'Bricks', entry by Ron Ringer, www.dictionaryofsydney.org, accessed 9 February 2010. See also Figure 164.

156 Otto Cserhalmi & Partners Pty Ltd Architects, *Sydney Park, Brick Kiln & Chimney Precinct, Repairs & Remediation Study*, Stage 1 Return Brief, February 2007, p. 3.

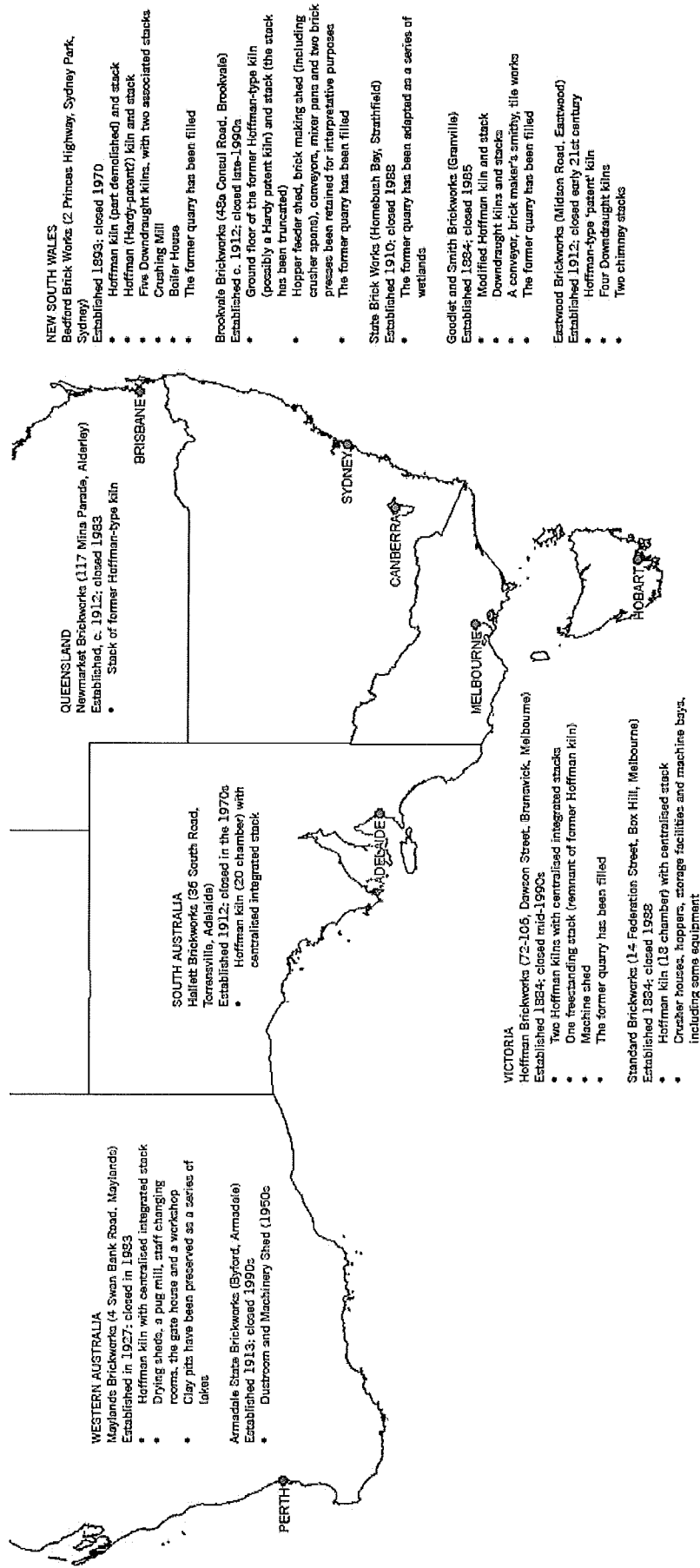


Figure 165 Surviving brickworks in Australia with continuous kilns dating to the late 19th and early 20th century. Note, there are no sites in northern WA, the Northern Territory and northern Queensland.

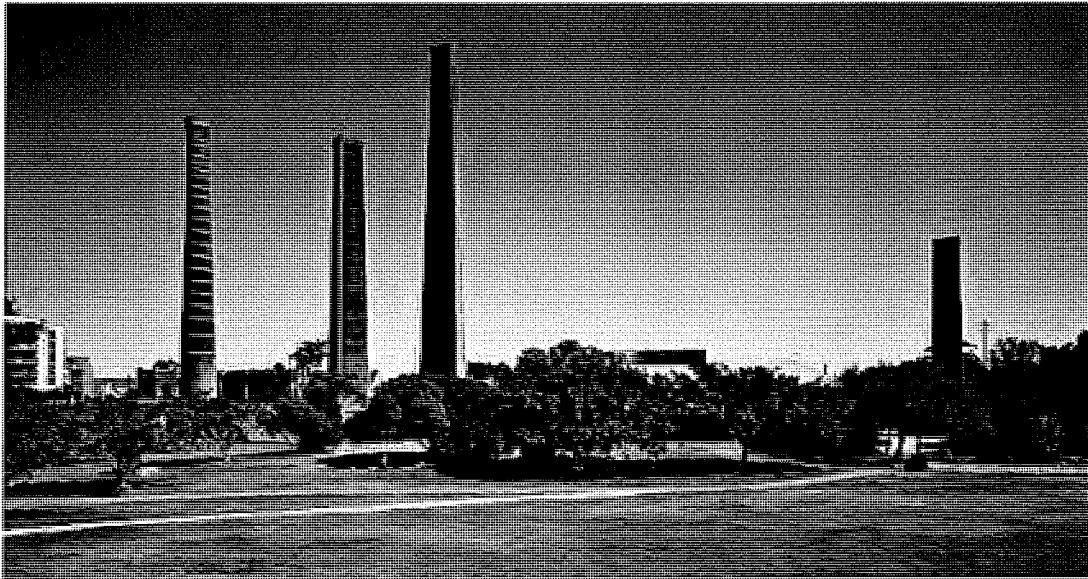


Figure 166 Stacks of the former Bedford Brick Works, with Sydney Park in the foreground, pictured 2008.
Source: Flickr.

Brookvale Brickworks (fmr) Brookvale

The Manly Brick and Tile Company built the Brookvale brickworks from 1910-12. The company was taken over by Brickworks Ltd in 1936. Austral managed the plant from the end of World War II to the late-1990s.¹⁵⁷

At its height, the Brookvale Brickworks included six downdraught kilns, located to the north and west of the site, and a large Hoffman-type kiln, with a square stack attached at one end (see Figure 167).¹⁵⁸ The arrangement of the Hoffman kiln is the same as the kiln at the Bedford Brickworks (fmr), which has been described as a Hardy patent kiln.

¹⁵⁷ 'The Kilns' development, www.thekilns.com.au, 'History of the site,' accessed 19 January 2010.

¹⁵⁸ 'The Kilns' development, www.thekilns.com.au, 'History of the site,' accessed 19 January 2010.

CANBERRA BRICKWORKS

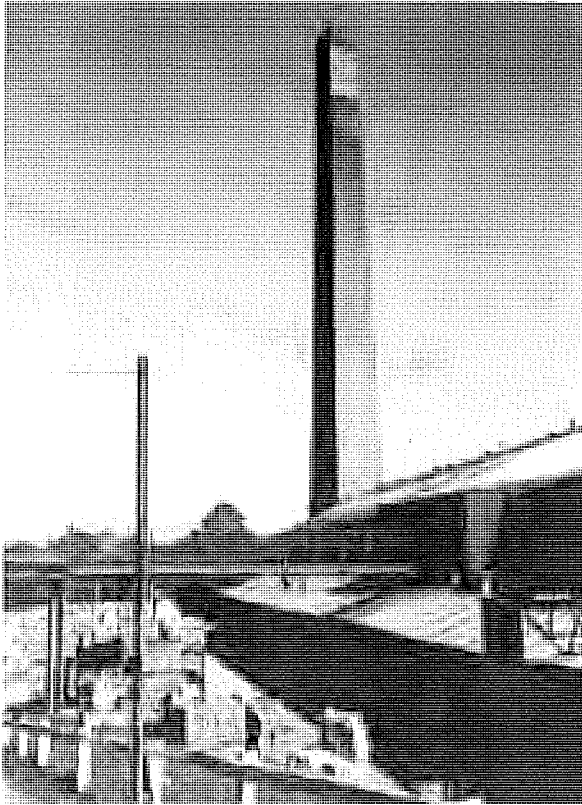


Figure 167 Brookvale Brickworks prior to redevelopment (undated).
Source: Warringah Image Library.

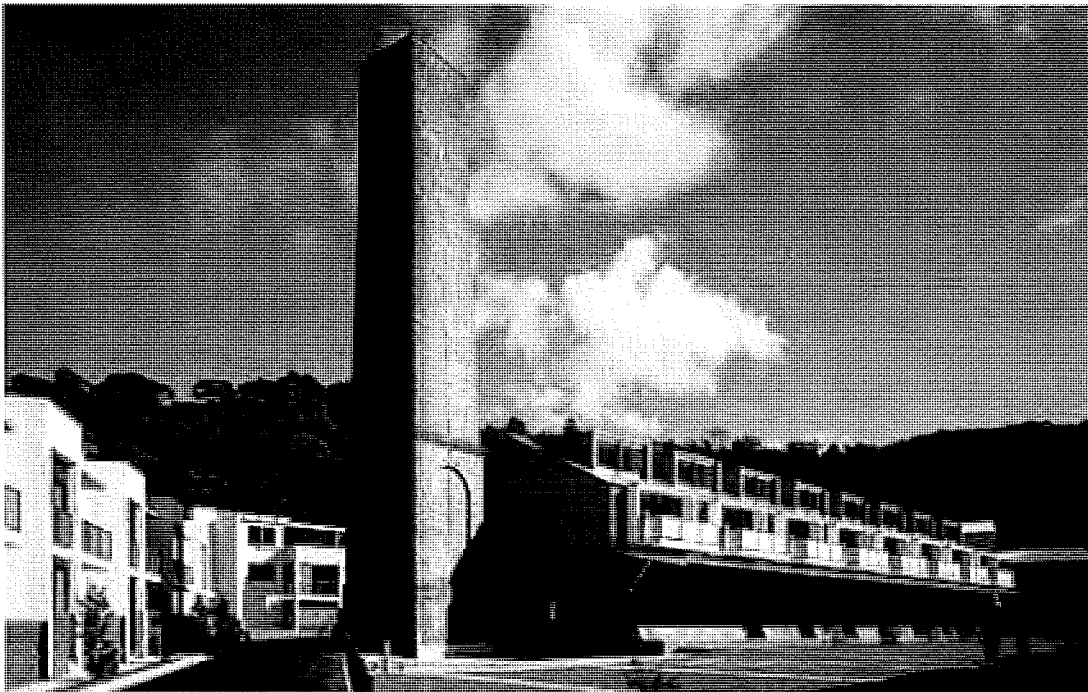


Figure 168 The adapted/redeveloped kiln and truncated stack at Brookvale Brickworks.
Source: www.marchesepartners.com.au

Following the closure of the brickworks in the late 1990s, and a CMP prepared by Pratten and Irving (1996), consent was granted for the re-zoning of the site¹⁵⁹ and its redevelopment as 71 townhouses and apartments. All the kilns have been demolished, with the exception of the lower section of the Hoffman-type kiln and the stack, whose height has been reduced by 11m from c. 50m (see Figure 168).¹⁶⁰ In addition, a hopper feeder shed, brick making shed (including crusher spans), conveyors, mixer pans and two brick presses been retained for interpretative purposes.

The site is included in the Warringah Local Environmental Plan, 2000 (listing number 80984).

State Brickworks (fmr), Homebush Bay, Strathfield

In 1910, Arthur Griffith, NSW Minister for Public Works, proposed the establishment of a Government brickworks that could produce cheap bricks and break the monopoly of private manufacturers. A 9.5ha site was purchased at Homebush Bay (also referred to as the Enfield Brickworks) and the site was operational by the end of the following year. Three Hoffman-type kilns were constructed in the first phase of development at the State Brickworks. The site was subsequently expanded (c. 1920) with the acquisition of 9.2ha, and construction of five further Hoffman kilns and six open kilns. Production continued intermittently at the State Brickworks until 1988.¹⁶¹ Clay extraction at the site ceased in the 1960s, from which point the brick pits were used as a municipal waste depot. ¹⁶²The former brick pits were developed as a freshwater wetland during preparations for the Sydney 2000 Olympics. The Enfield Brick Pits are included in the Strathfield LEP (1999), listing number 256.

Eastwood Brickworks (fmr), Parramatta

The Great Northern Brick Co Ltd established the former Eastwood Brickworks in 1912, to produce dry press bricks using locally available shale. A brickmaking shed and Downdraught kilns (possibly two) were built soon afterward. Expansion from the 1920s saw the addition of a 'patent' kiln, an additional Downdraught kiln, three grinding pans, and four Platt, one Clayton and two Whittaker presses. A 2002 description of the site referenced five Downdraught kilns, one Hoffman-type continuous 'patent' kiln and two chimney stacks.¹⁶³

The Hoffman-type kiln at the former Eastwood works appears likely to have been the last operational kiln of its type in Australia, ceasing operations at the beginning of the twenty-

159 The area occupied by the former brickworks has been re-zoned Residential 2(e); the land surrounding the brickworks has been designated an Environment Protection 7(a) zone. Brookvale Brickworks and Surrounds – Draft Land Use Study, report to the Strategy Committee Meeting, Warringah Council, 27 May 1997. See, www.warringah.nsw.gov.au/council/documents/81270597.pdf, accessed 19 January 2010.

160 Minutes of the Heritage Council Approvals Committee [NSW], 17 May 2001, item 7.1.

161 Ron Ringer, *The Brickmasters, 1788-2008*, p. 353.

162 Sydney Olympic Park, www.sydneyolympicpark.com.au, 'State Brickworks: 18901-1988,' accessed 19 January 2010.

163 Eric Martin & Associates, 'Eastwood Brickworks Project: Heritage Report,' 2002.

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Figure 169 Continuous kilns at State Brickworks, pictured 1957.
Source: NSW Heritage Register.

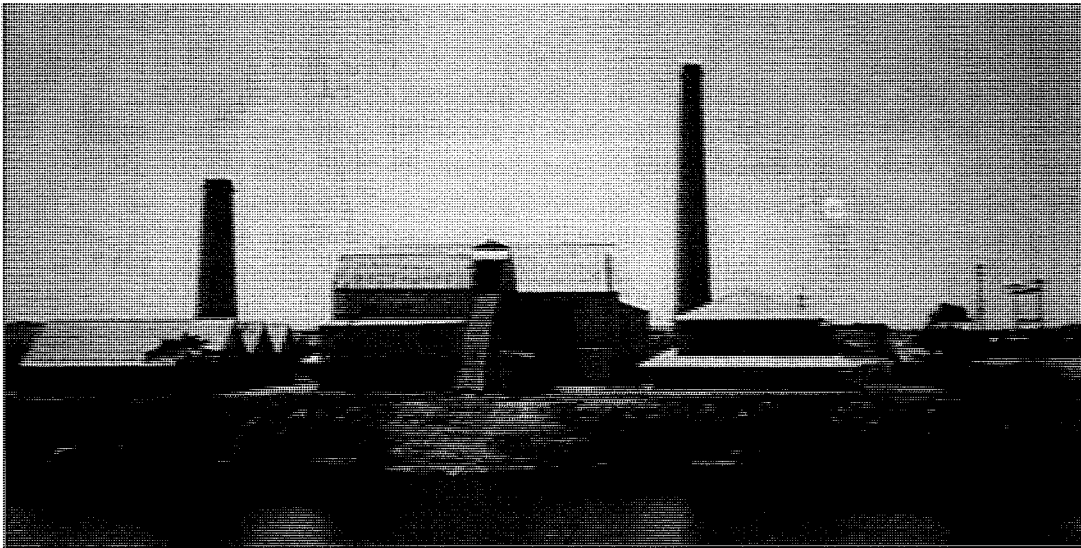


Figure 170 Continuous kilns at State Brickworks, pictured 1957.
Source: NSW Heritage Register.

first century (by then the site was commonly known as the Austral Brickworks).¹⁶⁴ The site is being developed for housing, including the filling of the former shale pit. The patent kiln

¹⁶⁴ Pers comm., Eric Martin of Eric Martin & Associates, and Adam Mornement, Lovell Chen, 4 February 2010.

and four of the Downdraught kilns are to be stabilised and retained as interpretive elements.¹⁶⁵

The site is included in the Parramatta Council Local Environment Plan 2001 as a Heritage Item. (See Figure 171)

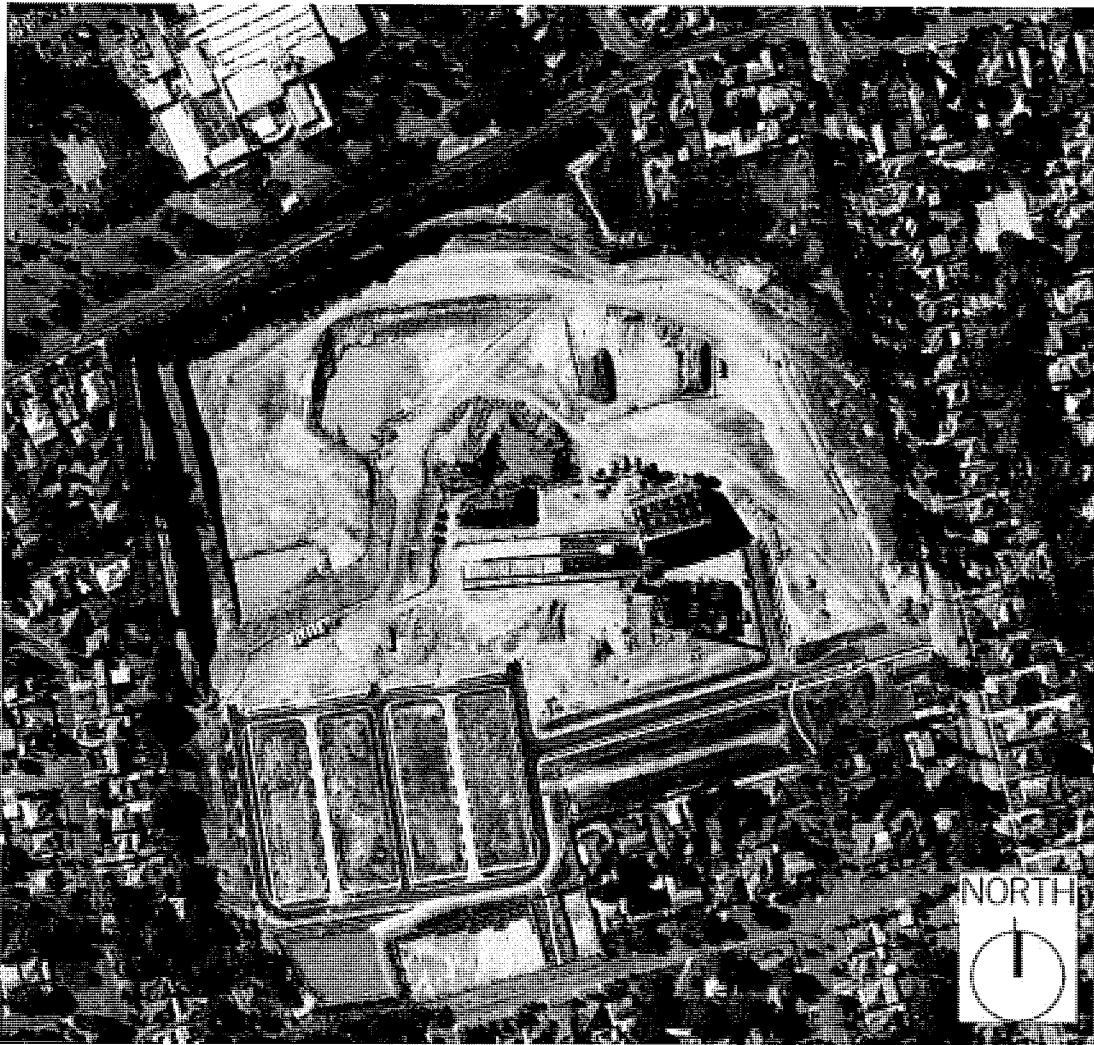


Figure 171 Recent aerial view of Eastwood Brickworks (fmr).
Source: Google Earth.

¹⁶⁵ Pers comm., Parramatta City Council planning department, and Adam Mornement (Lovell Chen), 11 March 2010.



Figure 172 Recent aerial view of Bowral Bricks.
Source: Google Earth.

Bowral Bricks, Bowral, Southern Highlands (operational)

Bowral Bricks was established in 1922,¹⁶⁶ and grew expanded into the major enterprise it is today (see Figure 172). A Hoffman-type kiln with a centralised integrated stack was constructed at the works (date unknown), and has subsequently been converted internally to two downdraught kilns. Externally, the kiln has 22 openings to chambers.¹⁶⁷ (See Figure 172)

Queensland

Newmarket Brickworks (fmr)

In c.1912, the Brisbane Brick and Builders Supply Co Ltd constructed a Hoffman kiln at the Newmarket brickworks, outside Brisbane. The kiln was built with a 50m-high stack with a

166 Bowral Brick, www.bowralbricks.com.au, 'History,' accessed 8 February 2010.

167 Pers comm., Stephen Wall, NSW Manufacturing Manager, Austral Brick Co Ltd, and Adam Mornement, Lovell Chen, 10 February 2010.

square plan, located approximately 15m from the kiln. This follows the model of the Hardy-patent and Staffordshire kilns at the Canberra Brickworks.

The Newmarket Brickworks closed in the 1970s, and was redeveloped for alternative industrial uses from 1987. The stack was retained, but all other elements at the site demolished. The chimney stack is identified as an Indicative Place in the RNE (ID 101989), and included in the Queensland Heritage Register (Place ID 601357).

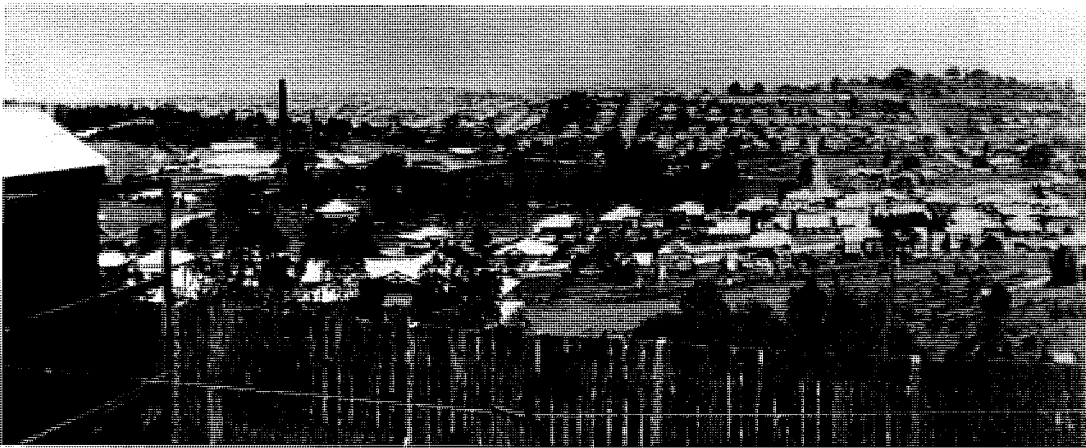


Figure 173 Panorama of Newmarket, c. 1925, with brickworks chimney visible to the left.
Source: State Library of Queensland.



Figure 174 Hoffman stack at the former Newmarket Brickworks.
Source: Queensland Heritage Register.

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South Australia*Hallett Brickworks (fmr), Torrensville, South Australia*

The Hallett Brickworks was established by Hallett Brick Industries at Torrensville in 1912. A 20-chamber Hoffman kiln, with rounded ends and centralised stack (circular), was built at the site later that year. It is believed to have been the first of its kind in South Australia. The kiln operated until 1975.

Since 1983, the former brickworks has operated as a market ('Brickworks Market'), which is open on Fridays, Saturdays, Sundays and public holidays. The kiln has been adapted to accommodate stalls and the like over two levels.¹⁶⁸ All machine sheds and ancillary buildings have been demolished.

Hallett Brickworks is included in the South Australian State Heritage Register.

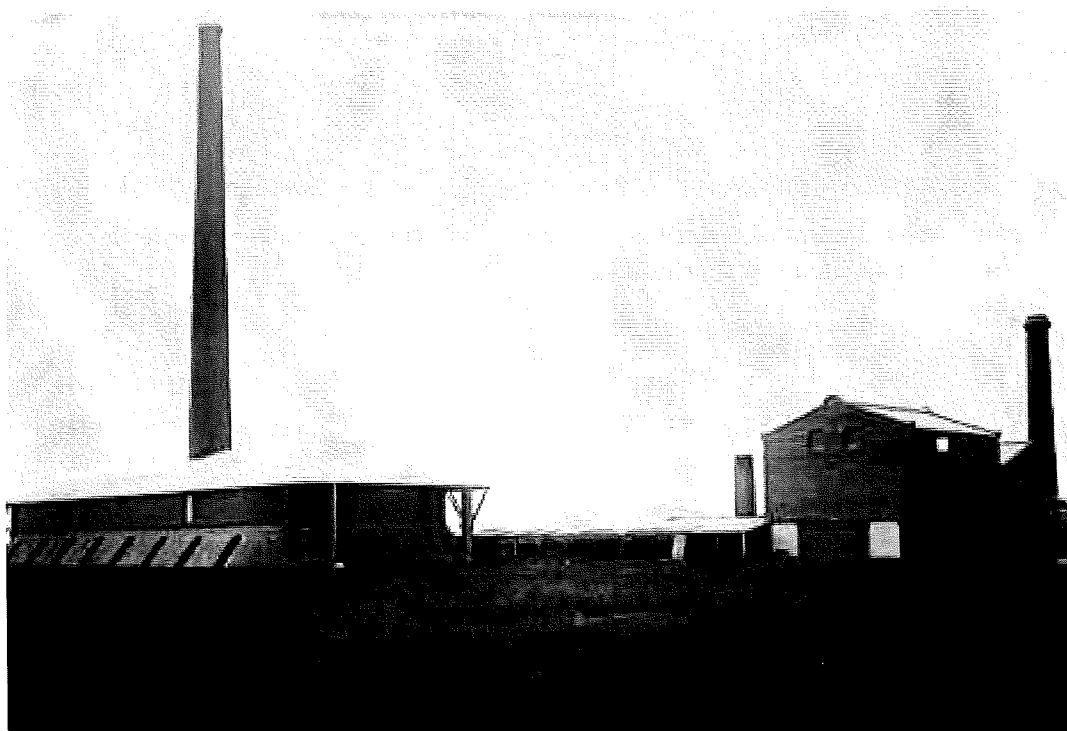


Figure 175 Hallett Brickworks (undated).

Source: www.brickworksmarket.com.au

168 Brickworks Market, 'History,' www.brickworksmarkets.com.au, accessed 18 January 2010.

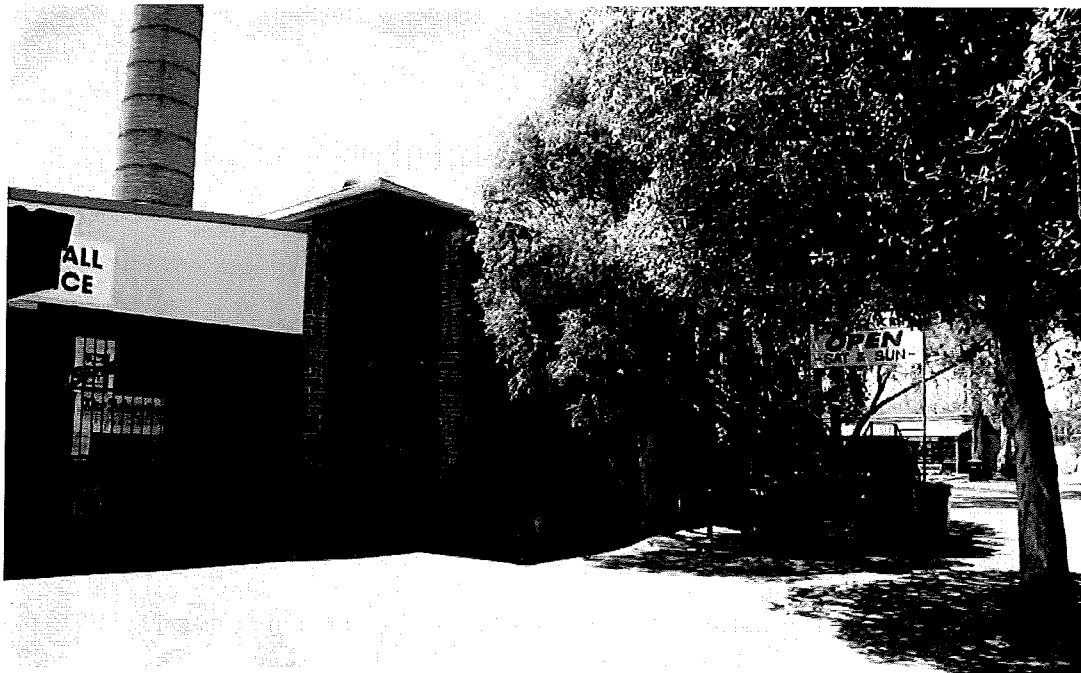


Figure 176 Brickworks Market (January 2010).
Source: Lovell Chen

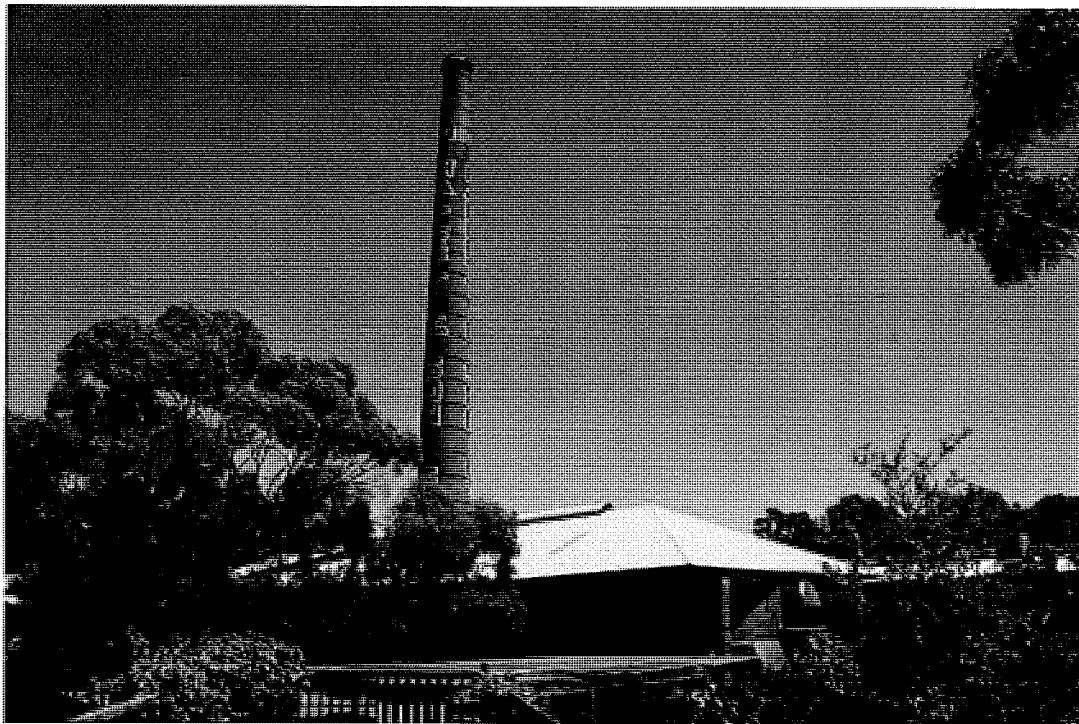


Figure 177 Brickworks Market (January 2010).
Source: Lovell Chen

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Victoria*Hoffman Brickworks (fmr), Brunswick, Victoria*

The Hoffman Patent Brick and Tile Company was established at premises in Albert Street, Brunswick in 1870. The company held the patent rights to import the Hoffman kiln. In 1884 the company established premises at Dawson Street in Brunswick (the Albert Street premises were subsequently vacated). Production at the Dawson Street plant ceased in the mid 1990s.

From 1884 the Hoffman Patent Brick and Tile Company built the following at its Dawson Street works: three elliptical Hoffman kilns (16, 18 and 20 chambers) with integrated stacks and associated technologies, including clay grinding sheds, brick pressing sheds, stores and warehouses. Pottery works and related facilities, including small circular bottle pottery kilns (demolished) were located to the east of the site. A clay pit was located to the north of site.

Land to the north of the kilns at the Hoffman Brickworks has been adapted as a residential development. As part of the adaptive reuse of the site, the northern-most Hoffman kiln has been demolished; only its stack survives. The two surviving kilns, and the former engine house, brick pressing shed and grindings sheds to the west of the site have been retained and approval has been given for their conversion for residential use. The Hoffman Brickworks site is included in the Victorian Heritage Register (H0703).

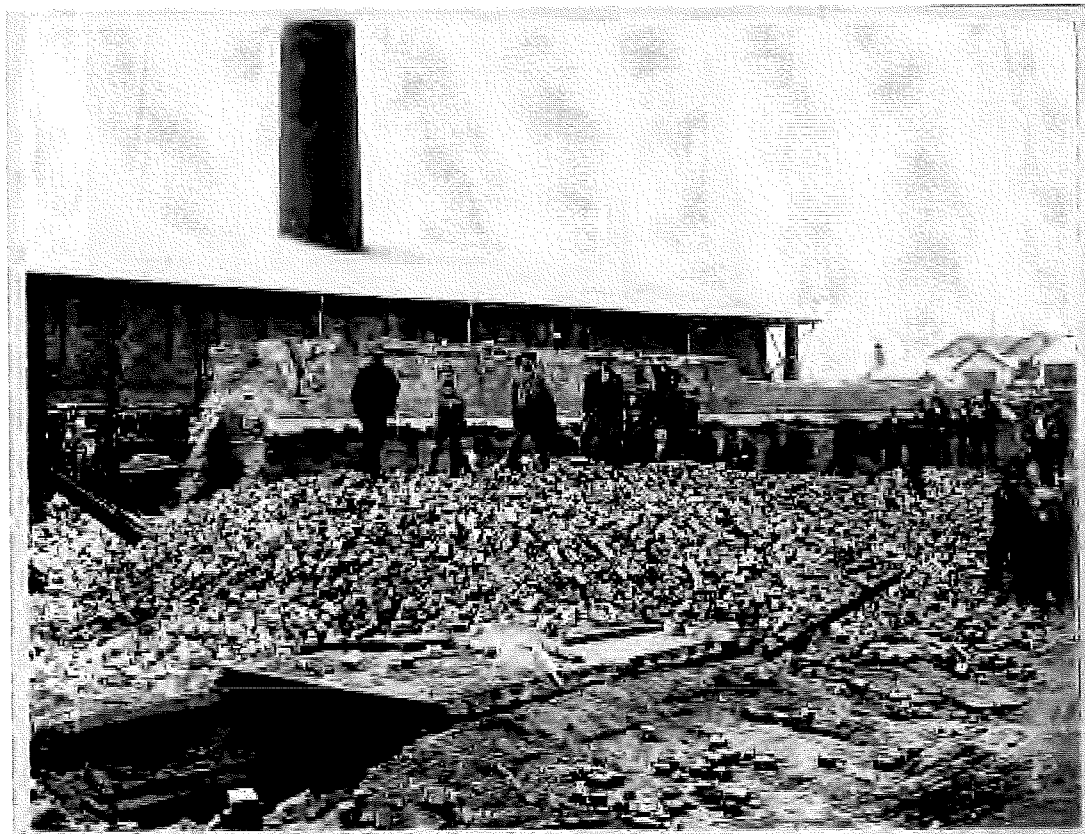


Figure 178 Hoffman Brickworks, 1930s.
Source: State Library of Victoria.



Figure 179 Former Hoffman works at Brunswick, pictured January 2010.
Source: Lovell Chen.

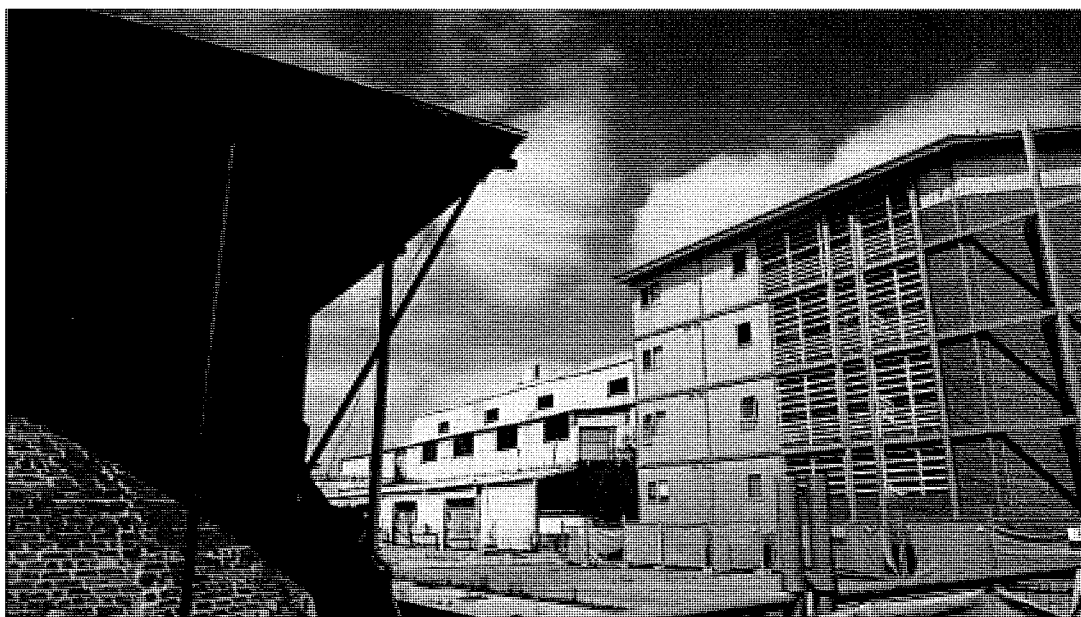


Figure 180 Former Hoffman works at Brunswick, pictured January 2010.
Source: Lovell Chen.

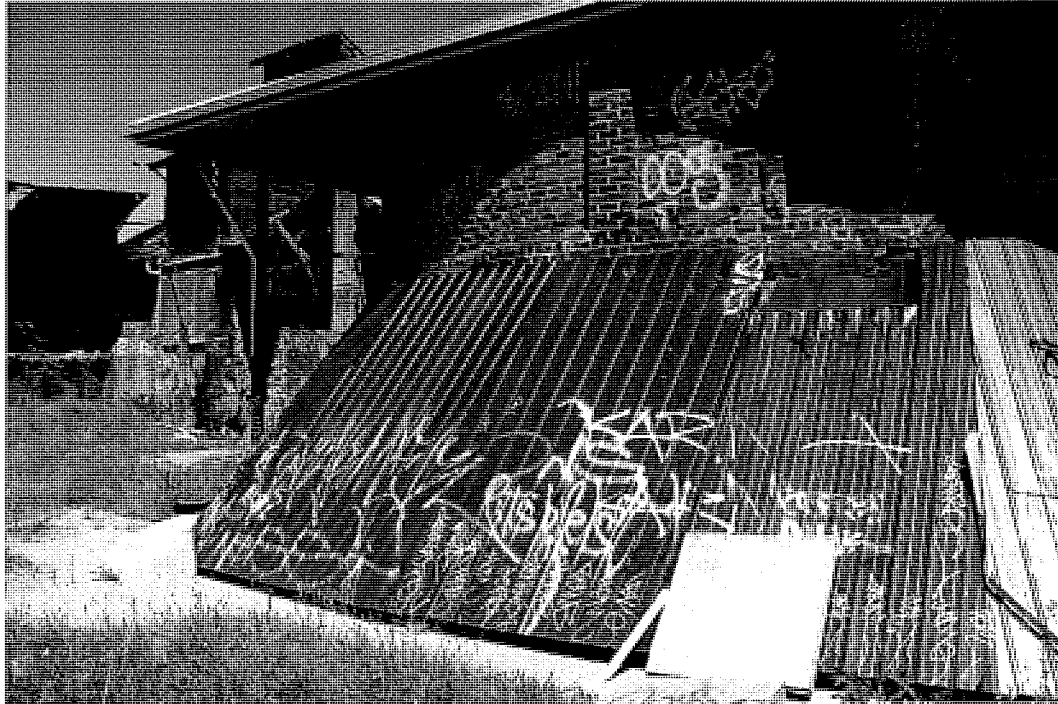


Figure 181 Hoffman kiln at the former Standard Brickworks, pictured in January 2010.
Source: Lovell Chen.



Figure 182 Former machinery sheds at the former Standard Brickworks, January 2010.
Source: Lovell Chen.

Standard Brickworks (fmr), Box Hill, Victoria

The former Standard Brickworks at 14 Federation Street, Box Hill, Victoria operated from 1884, as the Houghton Park Brick Company, until its closure in 1988. From 1913 until 1938, the site was owned and operated by the Standard Brick and Tile Company and it was during this period that the majority of existing buildings and fabric were completed.

An 18-chamber Hoffman kiln with a centralised integrated stack (circular) was built in c. 1913. Four brick presses were installed at the same time.¹⁶⁹ As existing, the site includes crusher houses, hoppers, storage facilities and bays, including some equipment. Despite a number of proposals for adaptive reuse/development, the site remains disused and the buildings are in poor condition, having been subject to extensive vandalism and graffiti. The ground level openings to the kiln have been boarded up.

The Standard Brickworks site is included in the Victorian Heritage Register (VHR H0720).

Western Australia

Armadale State Brickworks (fmr), Byford, Armadale

The State Brickworks at Armadale was established in 1913, following the *Government Trading Concerns Act* of 1912. The site operated intermittently until the 1990s. The Brickworks had been in private ownership since 1961.¹⁷⁰

A Hoffman kiln with integrated stack was built at the Armadale works in 1913-14. The next major phase of development was in the early post-WWII period, when 'No. 2 Pressed Brickworks' and 'No. 3 Wire-Cut Brickworks' were constructed at the site. Two 'Zigzag' kilns, a form of transverse arch continuous kiln, were constructed at the site during the post-WWII period.¹⁷¹ No.2 Brickworks, which included a dustroom and machinery shed, replaced the earlier facility.

All kilns at the site have been demolished. Only the Dustroom and Machinery Shed, built during the 1950s, survive. The machinery associated with these structures is also extant. The Dustroom and Machinery Shed are included in the Heritage Council of Western Australian Register of Heritage Places (place ID 15829). The site was included in the National Trust of Australia (WA) list of endangered heritage sites for 2008.

¹⁶⁹ Victorian Heritage Database, Former Standard Brickworks citation, VHR no. 0720.

¹⁷⁰ Heritage Council of Western Australia, Register of Heritage Places, Armadale State Brickworks Dustroom & Machinery Shed citation, place ID 15829.

¹⁷¹ A 'Zigzag' is a type of continuous kiln invented in Germany during the 1920s. It features a long fire zone advanced by suction fan. See, www.hablakilns.com/industry.htm, accessed 3 February 2010.

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Figure 183 Armadale brickworks c. 1905.
Source: State Library of WA.

Maylands Brickworks (fmr), Maylands, Perth

The Maylands Brickworks was developed by Messrs Atkins and Law from 1927.

The first phase of development included a Hoffman kiln and drying sheds, pug mill and brick making extruder. The plant was expanded in 1936, with an additional Hoffman kiln, pug mill and drying sheds. As existing the site includes one Hoffman kiln with 18 chambers and centralised integrated stack (34m high). The second kiln was demolished following damage sustained during the 'Meckering' earthquake of 1968. Brick production ceased at the site in 1983.¹⁷²

The kiln, stack and some ancillary buildings have been preserved. The site is included in the Heritage Council of WA database (no. 2410), and the Register of the National Estate, as an Indicative Place (ID 17340), in response to a public outcry against a proposal to develop them for residential use.¹⁷³

¹⁷² Heritage Council of Western Australia, Register of Heritage Places Assessment Documentation, place no. 2410 (Maylands Brickworks).

¹⁷³ Heritage Council of Western Australia, Register of Heritage Places Assessment Documentation, place no. 2410 (Maylands Brickworks).



Figure 184 Maylands Brickworks, 1950s.
Source: State Library of WA.

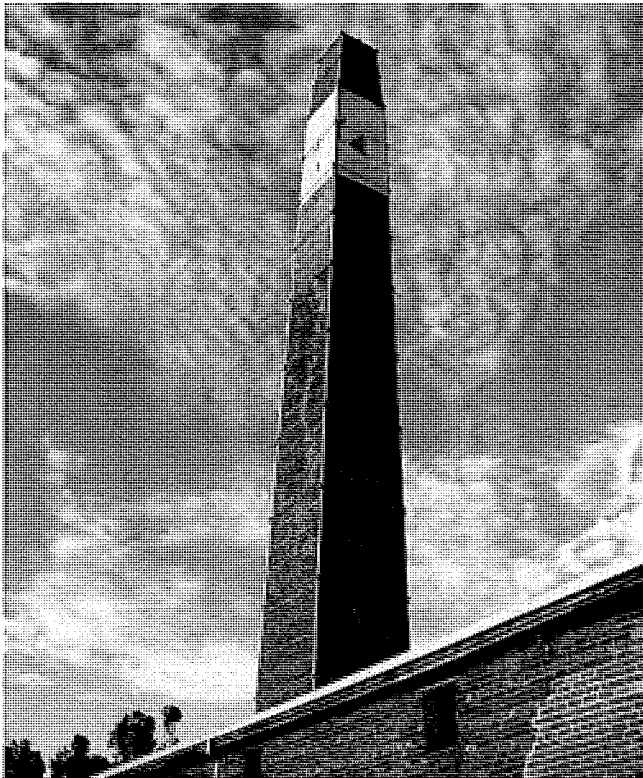


Figure 185 Recent shot of the Hoffman kiln and integrated stack at the former Maylands works.
Source: Flickr

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Midland Brick, Bassett Road, Middle Swan

Midland Brick is a major brick production company located at Middle Swan, north of Perth. It was established in 1946 by brothers Ric and Gerry New, and has operated consistently since that time. The first kiln at the site was built in 1946. This may have been a Downdraught kiln, but this has not been established. The first of nine tunnel kilns at the site was constructed in 1962. The most recent (Kiln 11) was completed in 2006. The site covers an area of 100ha, and the company claims to produce approximately 60 per cent of WA's total brick output.¹⁷⁴

7.2.2 *Conclusion*

Each of the surviving complexes identified above has particular qualities and characteristics, including kiln types, dates of construction and expansion, retention of plant and other attributes, and on this basis it is difficult to draw direct comparisons between them.

Accepting this, it is evident that the brickworks at Canberra is now one of a relatively small number of surviving sites which are able to demonstrate aspects of the operation of large-scale twentieth century urban brickworks. Compared with the majority of other sites reviewed, the Canberra site retains more evidence of the brick making processes, site layout and principal building components typically found on such sites, albeit expressed through a range of buildings of vastly different dates of construction rather than a coherent complex of elements constructed in one or more key phases. Conversely, the ability of the site to meaningfully demonstrate some of these processes has been compromised by the removal of the majority of the manufacturing plant itself (crushing and pressing plant). While through their form and construction, the kilns themselves (together with their related structures, fan houses and stacks) are evocative of the process that occurred within them, this is not the case for the simple steel-clad machinery bays, following the removal of the brick presses and other machinery and plant they accommodated. Only remnants of the conveying systems (conveyors and hoppers) remain in these buildings in a form that can be readily understood. The crusher houses similarly have had the majority of their plant removed.

In considering the kiln types remaining on site, in summary, the continuous kilns (Staffordshire and Hardy patent) sit within what is a now relatively limited group of surviving kilns – predominantly of the early to mid-twentieth century - which are either of or are based on the Hoffman continuous kiln typology. Within Australia there are now approximately 12 surviving kilns of this type, including Hoffmans, Hardy patent and others. Within the typology of continuous kilns the Staffordshire kiln was a rare – if not unique - design in Australia and is the only surviving example of this design. On this basis it is considered to be of additional interest.

Downdraught kilns of varying ages and design are found at a number of brickworks and related sites across Australia including three at the Sydney Park site and a number at the Bristle site in Perth. They are not rare as a building type.

¹⁷⁴ Midland Brick, 'About Midland Brick,' www.midlandbrick.com.au, accessed 3 February 2010.

7.3 Historic value

Historic value is defined in the guidelines to the Burra Charter as follows:

Historic value encompasses the history of aesthetics, science and society, and therefore to a large extent underlies aesthetic, social and scientific value. A place may have historic value because it has influenced, or has been influenced by, an historic figure, event, phase or activity. It may also have historic value as the site of an important event. For any given place the significance will be greater where evidence of the association or event survives *in situ*, or where the settings are substantially intact, than where it has been changed or evidence does not survive. However, some evidence or associations may be so important that the place retains significance regardless of subsequent treatment.

The Commonwealth Brickworks at Yarralumla was developed specifically to facilitate the construction of Canberra. The complex provides evidence of the establishment of the city following the decision to construct the National Capital in the Yass-Canberra district in October 1908. Subsequent phases in the development of the brickworks, until its closure, reflect the broader political context that determined the ebb and flow of the construction of the Federal Capital, with major phases of the development in the 1920s and post-World War II period.

The decision taken in 1914 decision to construct Australia's new Federal capital in an isolated bushland setting necessarily was followed by discussions relating to the provision of essentials such as water, power (electricity) and construction materials. The outcomes, respectively, were the Cotter Dam and pumping station, the Kingston Power House and the Commonwealth Brickworks. The first of these to be constructed was the brickworks at Yarralumla, which was then able to supply bricks for the construction of the Kingston Power House complex. However, as noted at Chapter 3, the bricks from the temporary works disintegrated and a decision was made to clad the steel frame of the Power House in unreinforced in situ concrete made with river gravel.¹⁷⁵

Prior to the closure of the Canberra Brickworks it had been estimated that c. 600 million bricks were produced at the plant for the construction of Canberra.¹⁷⁶ Early Canberra landmarks constructed of locally produced bricks include the Hotel Canberra (1925), the Provisional Parliament House (1927, see Figure 187) and Albert Hall (1928). From 1923, the brickworks was linked to these sites by a narrow gauge railway (removed).

The foundation stone of Canberra was laid on 12 March 1913, making Canberra the only Australian state or territory capital with twentieth century origins. Its foundation post-dated the introduction of continuous kiln technology in Australia (1870s), which facilitated the firing of bricks on a massive scale. Continuous firing heralded the demise of small scale brick manufacturing works, particularly in urban areas where demand was greatest. Brickworks and potteries were a common feature of all nineteenth century settlements of scale, typically

¹⁷⁵ Pers comm., Jocelyn Jackson, Project Director/Architect for the adaptive reuse of the Kingston Power House, Tanner Architects, and Adam Mornement, Lovell Chen, 3 February 2010.

¹⁷⁶ Lester Firth Associates Pty Ltd, *Old Canberra Brickworks, Conservation Plan*, June 1986, Section 2.1.4 (Post War Growth). The source for this estimate is not cited.

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being located adjacent to deposits of raw materials. The Brickworks at Yarralumla is the only facility of its type ever developed within Canberra's city boundary. It was replaced, in 1976, by a brickworks at Mitchell, north of the Federal Capital.

The Brickworks has also had a major part to play in the history of the local Yarralumla area. Along with the Westbourne Woods arboretum, the location and form of the Brickworks complex (the development of which predated Walter Burley Griffin's arrival in Australia) has clearly influenced the layout and historical development of the suburb in a physical/spatial sense. Additionally, the Brickworks has been a major employer in Canberra and while not investigated in the course of this report, it is reasonable to assume that many of the brickworks workers were local residents.

Conclusion:

The Commonwealth Brickworks is of historical significance at a Territory level as the first industrial or manufacturing facility constructed in the Australian Capital Territory and one of few early industrial complexes. This is in contrast with the other major Australian capital cities which have a more varied history of industrial and manufacturing activity and retain a range of surviving industrial buildings and complexes of different ages and types.

The site is also of significance for its role in the history and early development of Australia's national capital, Canberra, in the period to 1940. Bricks manufactured at the site were used to construct the majority of buildings in Canberra, including the major public buildings of the early period, such as Parliament House, the Hotel Canberra and many others.

The site is also of local historical significance for its role in the history and development of the suburb of Yarralumla (known originally as Westridge), including as a major employer in the local area.



Figure 186 Kingston Power House, with brickworks railway in foreground.
Source: NAA.

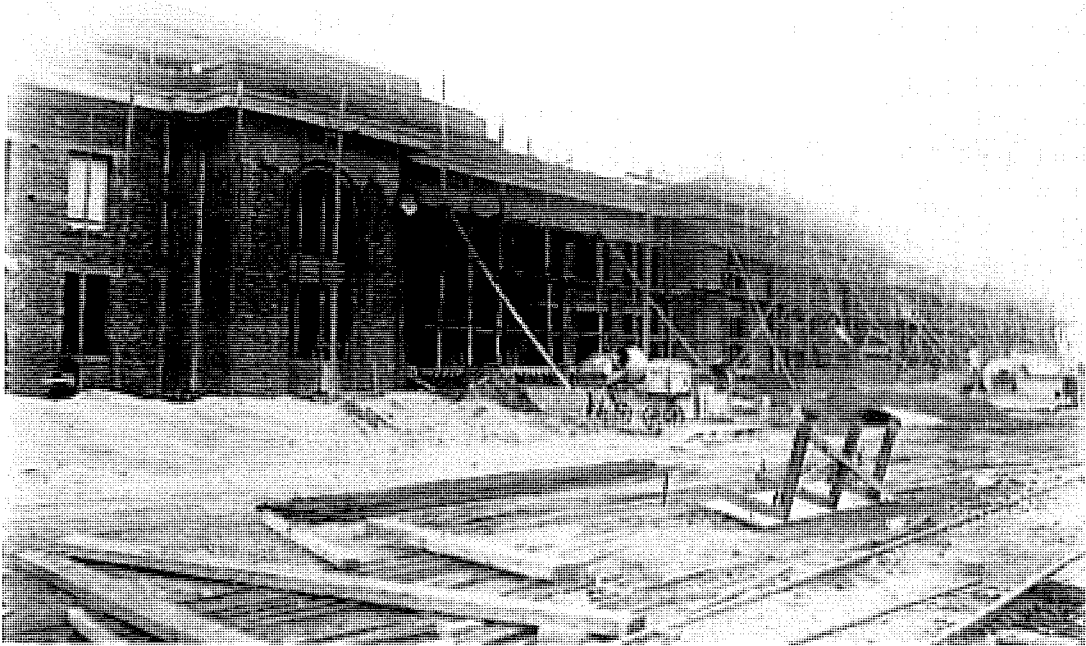


Figure 187 Parliament House prior to rendering (1926), with brickworks railway in foreground.

Source: NAA.

7.4 Scientific value

7.4.1 Introduction

Scientific value is defined in the guidelines to the Burra Charter as follows:

The scientific or research value of a place will depend upon the importance of the data involved, on its rarity, quality or representativeness, and on the degree to which the place may contribute to further substantial information.

For the purposes of this analysis, scientific value is considered to encompass both the geological values of the place, as well as issues of technology and the ability of the place to demonstrate manufacturing processes and technologies. These are discussed in turn.

7.4.2 Geological significance

The geology of the Canberra region has been the subject of extensive investigation and is well understood. It consists of a range of both sedimentary and volcanic rock types which are relatively common in south-east New South Wales. The main rock types are:

- Deep water sediments of late Ordovician and early Silurian age
- Shallow water sediments of middle to late Silurian age
- Volcanic rocks of middle Silurian to early Devonian age¹⁷⁷

¹⁷⁷ Lovell Chen, Nomination of Canberra to the National Heritage List: An examination of the merits, prepared for the National Capital Authority, April 2008, pp. 85-88.

There are also minor outcrops of recent river gravels and stream deposits.

The issue of geological significance was recently considered as part of a broader assessment of Canberra against the criteria for inclusion in the National Heritage List. This assessment concluded that while the underlying geology of the city and surrounds are not of national significance when considered as a whole, there are a number of individual sites in the region that are of a high order of significance.¹⁷⁸ These sites include the deep water sediments of late Ordovician and early Silurian age at the Ginninderra Road Cutting; and the Acton Limestone; the Coppins Crossing trilobite sites; and the Deakin Anticlines. The Canberra Brickworks pit was also noted as one of this group of individually significant sites. One site in the region was considered to be of national significance; this was the State Circle Cutting and Capital Hill unconformity beneath Parliament House.¹⁷⁹

The site at Yarralumla was originally selected for development as a brickworks because of its readily available shale deposits. The shale was extracted from the quarry east of the brickmaking complex and was used in production at the site from 1913 to the mid-1930s, after which time, the raw materials were sourced elsewhere. Unlike many other disused quarries, or brickpits, the one at this site was not filled following its closure and a series of rock formations incorporating fossils remained exposed. As a result, from at least as early as the 1950s, the brickworks quarry was identified by geologists and became known more widely as a site where aspects of the local geology could be viewed and analysed.

The geological significance of the site derives from it being the 'type locality' of the Yarralumla Formation, the origins and characteristics of which are summarised in the recently published *Geological Guide to Canberra Region and Namadgi National Park* (Geological Society of Australia (ACT Division):

During the Tabberabberan Cycle there were episodes of volcanism and these provided source rocks for continued sediment deposition into shallow seas. In the period 424-423 Ma the Yarralumla Formation (calcareous and tuffaceous mudstone and siltstone) was deposited within the Canberra Rift.

These Yarralumla Formation sedimentary sequences are now evident in central Canberra, principally at the old Canberra Brickworks near Weston Park and on Red Hill but also at outcrops in the suburbs of Deakin, Hughes and in road cuttings along the Tuggeranong Parkway west of Curtin. The Yarralumla Formation (mudstone, siltstone, about 424-423 Ma) was deposited in a shallow sea following the eruption of the Mount Painter Volcanics (about 425-424 Ma), and at about the same as the eruption of the Deakin Volcanics (about 423-422 Ma).¹⁸⁰

¹⁷⁸ Lovell Chen, Nomination of Canberra to the National Heritage List: An examination of the merits, prepared for the National Capital Authority, April 2008, pp. 86.

¹⁷⁹ Lovell Chen, Nomination of Canberra to the National Heritage List: An examination of the merits, prepared for the National Capital Authority, April 2008, pp. 86.

¹⁸⁰ Geological Society of Australia (ACT Division), DM Finlayson (comp.). *A Geological Guide to Canberra Region and Namadgi National Park*, pp. 33-34.

The Yarralumla Formation is fossiliferous in places including brachiopods, trilobites, corals, bivalves, bryozoans, and crinoids.¹⁸¹

In geological terms a 'type locality' is a place at which a stratigraphic unit is typically displayed and from which it derives its name and/or the place where a geologic feature was first recognized and described. The brickpits at Yarralumla were identified as the type locality for the Yarralumla Formation by geologist A A Öpik as early as 1954 and again in his 1958 work for the Bureau of Mineral Resources (the precursor to Geoscience Australia), *Geology of the Canberra City District*.¹⁸²

The Canberra Brickworks site is among Canberra's oldest identified Geological Monuments, having being designated as such by the Geological Society of Australia in the 1960s. The Brickworks pit site is complemented by another site, an outcrop in what is known as the Deakin Anticline, behind the Deakin Shopping Centre.

Together, the two sites are able to demonstrate the key characteristics of the Yarralumla Formation.¹⁸³

Within the quarry, four specific locations (A, B, C D) have been identified which demonstrate particular aspects of the site and the Yarralumla formation (see Figure 189). These are mapped in Figure 188 as 12A, 12B, 12C and 12D. Of these, Sites A and D show excellent examples of anticline in calcareous siltstone and Site B shows a typical tuffaceous mudstone and siltstone of the Yarralumla Formation. Site C shows abundant fossils of mainly brachiopods [note, not *gracitopods*], trilobites and crinoids preserved in a bedding plane.¹⁸⁴

181 G A M Henderson. *Geology of Canberra, Queanbeyan & Environs; Notes to Accompany the 1980 1:50,000 Geological Map, AGPS (Bureau of Mineral resources, Geology and Geophysics)*, 1981, p. 5.

182 G A M Henderson, *Commentary on the Coppins Crossing 1:10,000 Engineering Geology Sheet, Canberra, Canberra, Australian Capital Territory, Bureau of Mineral Resources, Geology and Geophysics, AGPS, Canberra, 1980, p. 27, referencing A A Öpik, Geology of the Canberra City District, Bureau of Mineral Resources, Australia, Bulletin 32, 1958. See also A A Öpik 'The Geology of the Canberra City District', in Canberra: A Nation's Capital (ed., H L White), Angus & Robertson, Sydney, 1954, p. 142.*

183 DL Strusz, pers. comm. K Gray, Lovell Chen, 29 January 2010. Des Strusz is a geologist who retired from Geoscience Australia in 1996. Since his retirement he has been a Visiting Fellow at the Australian National University. He is a corresponding member of the International Sub-commission on Silurian Stratigraphy, has authored and co-authored a number of publications on the geology of the Canberra region and is a long standing member of the Geological Society of Australia. *A Geological Guide to Canberra Region and Namadji National Park*, p. 139.

184 Register of the National Estate entry for Yarralumla Brickworks (extended area), Denman St, Yarralumla, ACT, Australia (file no. 101439).

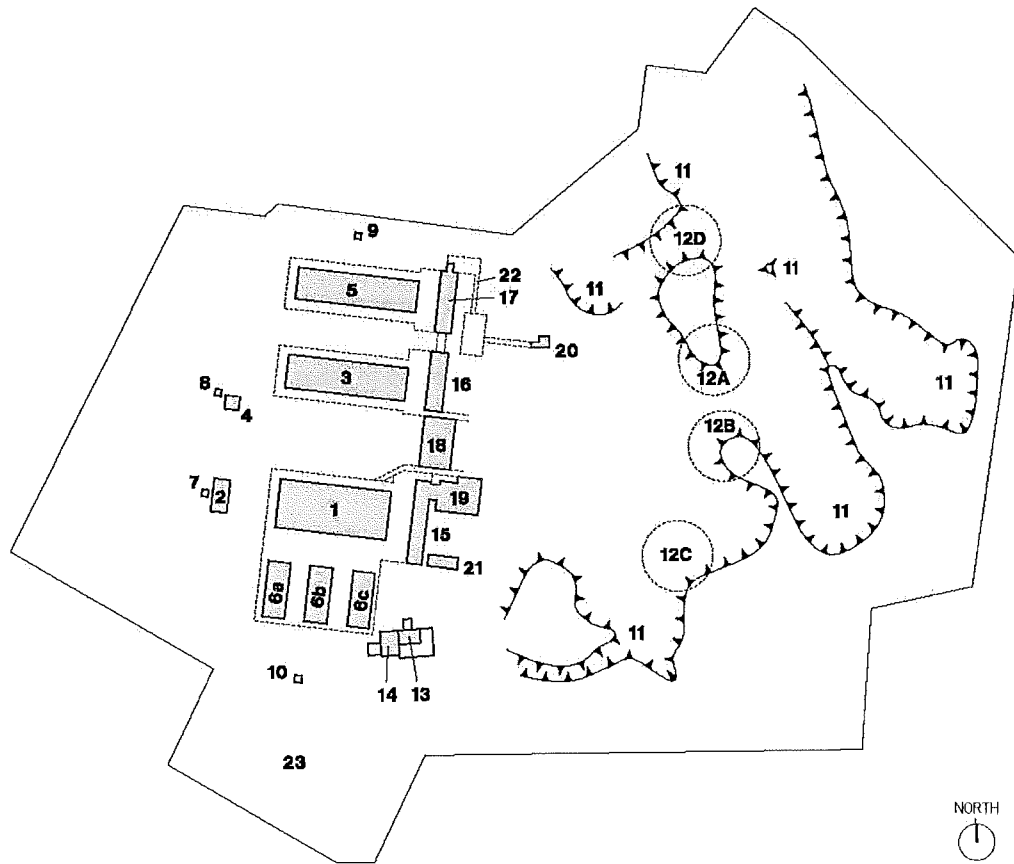


Figure 188 ACT Heritage Register plan of the site, showing the location of the specified geological features, 12A-12D.



Figure 189 Formations A (left) and B (right).

7.4.3 *Technological significance*

Ability to demonstrate

The technological significance of the Canberra Brickworks derives in part from the ability of the complex to demonstrate aspects of the manufacturing processes that occurred on the site. Refer to Chapter 2 for a description of these.

As noted, aspects of the brickmaking process as it occurred in the earlier period (1913-1940s) of the site's history remain legible through the overall site layout and key buildings and site elements remaining from the establishment and expansion periods, however the early crushing, grinding and pressing buildings have all been removed as has much of the associated plant.

To the extent that the majority of process buildings on the site from the 1950s through to the 1970s still remain (in addition to the earlier kilns, fan houses and stacks), more substantial evidence remains of the brick making processes as they occurred on the site in this later period. While the complex as it existed in this period is not complete (the Red Pan Room and the conveyor linking this with the Primary Crusher have been demolished), the majority of buildings and elements remain. Again, however, while sections of the conveying system and associated hoppers remain in the Machine Bays, the ability of the complex to demonstrate process has been diminished by the removal of the majority of manufacturing plant itself (crushing and pressing machinery).

The movement of processes across the site in a broadly east-west direction remains evident for both phases. In the first phase, this originated with the extraction of the shale from the quarry on the eastern half of the site, and its movement west across the site through the process buildings (now demolished) to the kilns. In the later phase, while the raw materials were sourced elsewhere and brought onto the site they were delivered (access to the site has always been in the vicinity of the current entry) into the area to the east of the Machinery Bays and were also stored within the quarry and so the processes occurred following a similar pattern across the site.

In considering the ability of the complex to demonstrate processes and layout, this relies on key characteristics of the layout of the site as well as the combination and arrangement of elements and the relationship between them. For example, an appreciation of the operation of the kilns themselves relies not just on the surviving kilns but also on their relationship with their associated fan houses and stacks. The location and form of the Machinery Bays and Crusher Houses and their relationship with the kilns demonstrate other aspects of the process. The large open spaces between the kilns are the brick yards and are also key to an understanding of process.

The surviving kilns and associated stacks and fan houses

Six types of kilns are known to have been constructed (or - as in the case of the aborted tunnel kiln - partially constructed) at the Canberra Brickworks, of which three types survive: the Staffordshire, Hardy patent and Downdraughts kilns. Each type is of some technological interest as an example of brick kiln design, though they vary both in terms of the level of interest and their relative rarity.

Regardless of their specific design attributes, all three of the continuous kilns (Staffordshire and Hardy patent kilns) are considered to be of technological significance as increasingly rare

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examples of such kilns. There are now thought to be in the order of 12 kilns of this typology nationally. Relatively few of these retain their associated fan houses and stacks (in many cases, stacks remain but fan houses are demolished). Furthermore, some of the kilns themselves appear to have been modified in the course of adaptation works (see, for example the Brookvale example). While altered to a greater or lesser extent during and after their working life, the Canberra examples are distinguished by the survival of their associated fan houses and are also assumed to retain all their associated underground workings (flues etc).

In addition, the Staffordshire kiln and its associated stack and fan house, is of particular interest on the basis it is understood to be the only surviving example of the type in Australia. There has been a suggestion that Staffordshire kilns were constructed at the State Brickworks at Homebush Bay, in 1911-12, but if this was the case, the kilns have now been demolished. Plans by the Australian Tesselated Tile Works to construct a Staffordshire kiln at its works in Mitcham, in Victoria appear not to have come to fruition.¹⁸⁵

The intermittent Downdraught kiln, introduced in the late nineteenth century, quickly became popular. However, by the time of the construction of the three extant Downdraughts at Yarralumla (early 1960s), it was more commonly associated with smaller country works. These kilns are not rare and there are numerous examples surviving across Australia.

7.4.4 Conclusion

The Canberra Brickworks site as a whole is of historical and scientific (technological) significance for its ability to demonstrate aspects of brick production processes in the twentieth century. While individual brickworks varied in their layout and building forms, including variation in kiln types, there were common elements and building types and the majority of these (ranging in date from 1915 to the 1970s) are represented in some form or another at this site. When compared with other surviving complexes, the Canberra Brickworks retains a relatively greater range of production and ancillary buildings, though crusher houses, power houses and the like also remain on a number of other former brickworks sites. Importantly, other than for the conveying system, the Yarralumla site has had the majority of its plant and machinery removed, diminishing its ability to demonstrate key aspects of the brick making process and the associated technologies.

The individual kilns themselves are of varying levels of technological interest and significance as examples of kiln design.

- The Staffordshire kiln (completed 1915) is the only known example in Australia of this particular type of continuous kiln. It is of interest for its design which through a relatively complex system of dampers and flues offered more control and flexibility than earlier types.

¹⁸⁵ Based on a review of historic photographs. A letter from R E Odd, patentee of Staffordshire and Manchester continuous brick kilns in Australia, to Andrew Christie, Consulting engineer who inspected the new Homebush kilns in association with P T Owen, Director-General of Works for the Federal Capital, dates 21 July 1911, refers to the Mitcham kiln. A copy of the letter is included in Lester Firth Associates (1986), Staffordshire Kiln, c. 1916 Data Sheet (unpaginated).

- The Hardy patent kilns are considered to be of a lesser order of technological significance, though they are of interest as an example of a patented variation on the Hoffman kiln design originating from the late nineteenth century. There are a number of examples of Hoffman and patent kilns dating from the first half of the twentieth century in Australia. Of the two kilns the later one (Kiln 3) is more intact.
- The three downdraught kilns are of limited technological interest. They are relatively late examples of this type of intermittent kiln design and there are numerous other and earlier examples surviving elsewhere.

The fact that three different kiln types exist on the one site is of interest but is not considered to be of particular technical or technological significance. The sequence of kiln types constructed on the site over its 63-year history does not reflect in any sense any progression or advancement in kiln design; both the Hardy patent kilns and the downdraught kilns were long-established kiln types when constructed on this site.

The Canberra Brickworks site is considered to be of scientific (geological) significance as the type locality for the Yarralumla Formation, a major sedimentary sequence dating from the Silurian Period, 424-423 million years ago. The rock units at the site provide the reference section for comparison of other outcrops within the Yarralumla Formation and in this context are of both research and educative value.

7.5 Aesthetic value

Aesthetic value is defined in the guidelines to the Burra Charter as follows:

A place may have aesthetic value because of the form, scale, colour, texture and material of the fabric; the smell and sounds associated with the place and its use.

In 1912, when the Commonwealth Government acquired the site of the brickworks, the site was located in a gently undulating agrarian landscape. The site acquired for the brickworks in 1912 comprised a gentle hill, rising from the south-east and sloping down to the north-west. The brickworks were developed to the north-west of the incline, concealing the site in views from the south and east (see Figure 190) and this remains the case today. In the immediate vicinity, while the viewer is aware of the site to a greater or lesser degree, depending on the vantage point, the site does not have a particularly strong visual presence or aesthetic quality beyond its site boundaries. The one exception is the 1953 chimney which is a prominent element in the immediate vicinity and a marker for the site.

In more distant views comparatively flat landscape leading to the Molonglo River allows some limited glimpses to the site from the north shore of Lake Burley Griffin and Black Mountain (see Figure 191, Figure 192 and Figure 193). The taller chimney stack (Building 13 built 1953) is visible in these views from the north shore of the Lake (refer Figure 193) but is not considered particularly prominent in such views.

The aesthetic qualities of the complex are generally experienced from within the site itself and relate to the robust industrial quality of the buildings, particularly as expressed through the scale and distinctive forms of the kilns and chimneys and to a degree also through the materiality of the building complex as a whole (predominantly a combination of red brick and corrugated iron). The quarry itself also has a particular aesthetic quality, deriving from the combination of open landscape and striking exposed rock outcrops.

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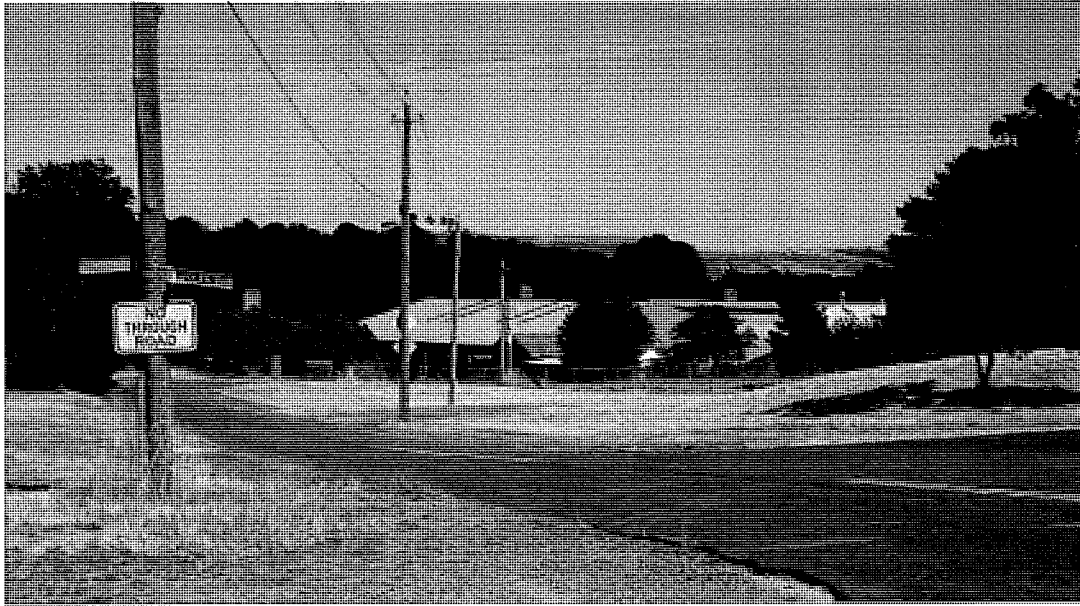


Figure 190 View of site from crest of hill on Denman Street.

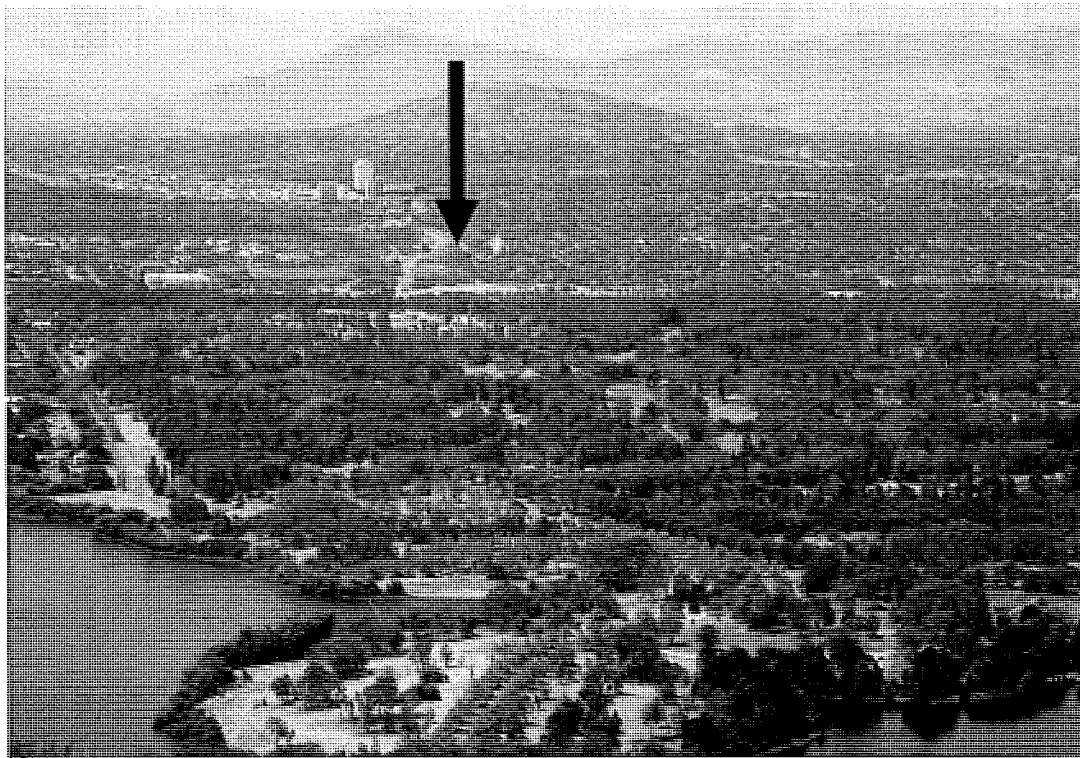


Figure 191 Distant view towards Canberra Brickworks from Telstra Tower, Black Mountain.

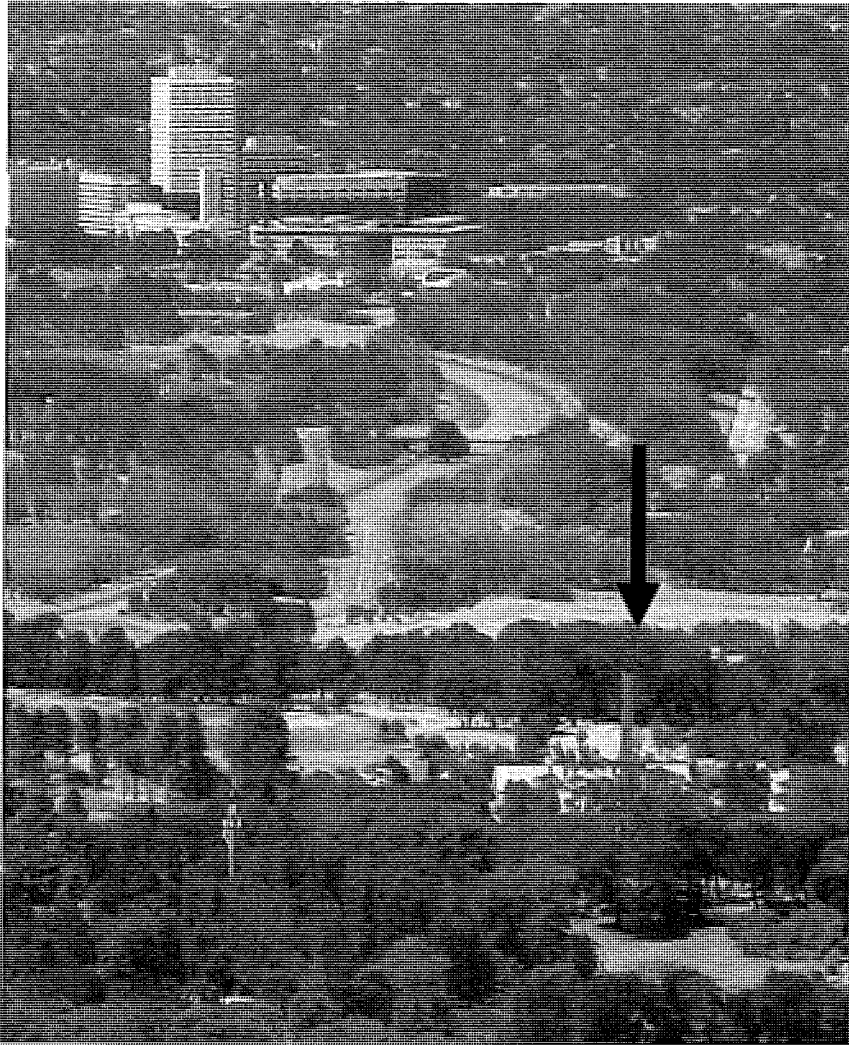


Figure 192 Detail view.

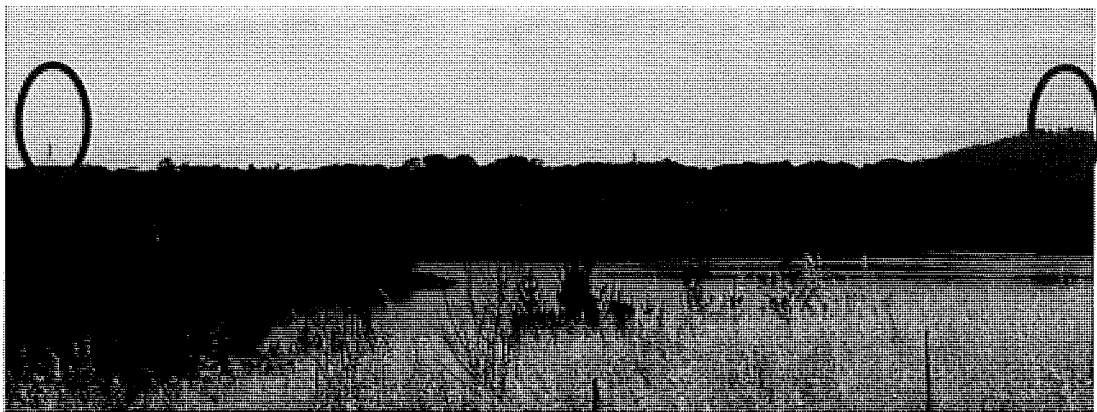


Figure 193 Canberra viewed from the north bank of Lake Burley Griffin. The 1953 stack at Canberra Brickworks and Parliament House are highlighted.

While residential and other development abuts to the site to the east and north, the landscape both within and beyond the site boundaries to the south and west has an open woodland quality. The understated siting of the complex and the relatively open landscaped nature of this setting contribute to a sense of remoteness from the urban environment which is distinctive and imparts a particular aesthetic quality experienced from within the site.

7.5.1 Conclusion

The complex is considered to be of aesthetic significance for its combination of distinctive and robust industrial building forms and the open landscape quality and striking rock outcrops of the quarry. The 1953 chimney is a landmark in the local area.

7.6 Social value

Social value is defined in the guidelines to the Burra Charter as follows:

Social value embraces the qualities for which a place has become a focus of spiritual, political, national or other cultural sentiment to a majority or minority group.

7.6.1 Assessing social value

The social value of a heritage place has been described as, 'the special meanings attached to places by groups of people (rather than by individuals)',¹⁸⁶ A critical consideration in establishing the social significance of a place is its value to the present community. This sense of communal attachment is typically associated with places that are publicly accessible, or have otherwise been, '*appropriated* [sic] into the daily lives of people'.¹⁸⁷ Places recognised as having social value include those that:

- Provide a spiritual or traditional connection between past and present;
- Tie the past affectionately to the present;
- Help give a disempowered group back its history;
- Provide an essential reference point in a community's identity or sense of itself;
- Loom large in the daily comings and goings of life;
- Provide an essential community function that over time develops into a deeper attachment that is more than utility value;
- Have shaped some aspect of community behaviour or attitudes';
- Are distinctive - the old clock tower in a town or an architectural folly – features that lift a place above the crowd, making it likely that special meanings have been attached to that place;
- Are accessible to the public and offer the possibility of repeated use to build up associations and value to the community of users; and

¹⁸⁶ Chris Johnston (Ms), *What is Social Value? A Discussion Paper*, Australian Government Publishing Service, Canberra, 1994, Foreword.

¹⁸⁷ Chris Johnston (Ms), *What is Social Value?*, pp. 7-11.

- Places where people gather and act as a community, for example places of public ritual, public meeting or congregation, and informal gathering places.¹⁸⁸

Indications of a community's attachment to a place might be reflected in a history of communal action to protect the place from development; inclusion in local walking tours; and representation in postcards or websites for the area.

Social significance or value is typically established through community consultation, sometimes in the form of survey questionnaires, interviews with members of the relevant communities or public discussion workshops. Opinion pieces in the local print media, and views expressed in talk-back radio shows can also be forums for the expression of community sentiment. Community consultation is rarely a 'scientific' process, although it is generally the case that the broader the cross-section of the community invited to express opinions, the greater the certainty about the outcomes.

7.6.2 *Yarralumla Residents Association*

The Yarralumla Residents Association (YRA) was formed in 1988, in response to concerns that the *Yarralumla Brickworks South Canberra Policy Plan* (1988) was thought by many in the community to be poorly resolved to have failed to address key issues with regard to the site. The YRA has subsequently been prominent in discussions about the future development of the Brickworks.

7.6.3 *Yarralumla Neighbourhood Plan*

In 2003, during the preparation of the *Yarralumla Neighbourhood Plan* by the ACT Planning and Land Authority, people who 'live, work, play and invest' in Yarralumla were invited to comment on the future of the suburb.¹⁸⁹ Techniques used to engage with the community included: a 'values survey letterboxed to all residents'; a 'future character survey letterboxed to all residents'; a 'Neighbourhood Character Discovery' process, in which residents used disposable camera to take pictures of valued features; and a series of community workshops and forums.¹⁹⁰

An assessment of the 'Values of the Yarralumla Community' found that 1% of those questioned described 'Community Facilities' as a valued aspect of the suburb. Community facilities in this context include the childcare and primary school, shops, churches, medical facilities and the Canberra Brickworks. A total of 69% of respondents described the suburb's 'Open Space & Environment' as valued features of the community. The top three responses to the question, 'What are Yarralumla's Favourite Places?' were: Lake Burley Griffin, Weston Park and Stirling Ridge.¹⁹¹

A discussion of 'Future strategies' in relation to the Brickworks Precinct noted that a 'Conservation and Management Plan' for the site had yet to be prepared, and that future uses of the site were likely to be informed by the site's, 'cultural heritage importance,' 'the location beside the treed inter-town buffer space for Inner South Canberra' and the tall

¹⁸⁸ Chris Johnston (Ms), *What is Social Value?*, p. 7.

¹⁸⁹ ACT Planning & Land Authority, *Yarralumla Neighbourhood Plan*, 2004.

¹⁹⁰ *Yarralumla Neighbourhood Plan*, 2004, p. 3.

¹⁹¹ *Yarralumla Neighbourhood Plan*, 2004, pp. 8-10.

chimney as a 'landscape landmark'.¹⁹² The possibility of linking the Yarralumla Centre retail and residential area with a 'heritage walk' to the Brickworks was also raised.¹⁹³

7.6.4 Conclusion

The scope of this CMP has not allowed for a detailed investigation of the social values that might attach to the place. Notwithstanding, it is reasonable to assume that the place well may be the subject of social value and attachment to people who have worked at the site, whether that be during its operational life as a brickworks, or in more recent times. Beyond this, the site may also have some social value for the activities that occurred at the site in the period when it was publicly accessible (during the 1980s and 1990s when it was in use as an antiques market and other uses).

Beyond this, however, the site is not one which is currently accessible to the public and so is not experienced directly. It is not a place where people gather or where community activities take place. It is a major site in the local area, although interestingly, it has no major public presence and other than from the private properties directly abutting the site, is glimpsed rather than viewed. This is with the exception of the 1950s chimney, which is a local landmark and marker for the site.

Unsurprisingly, given its scale, heritage values and location, the Brickworks is a place which has been the focus of major interest for the local community focusing largely on the issue of potential future development (but including a consideration of the issue of heritage). Such interest can be reflective of social value as it is understood in a context of cultural heritage, but can also be linked to other concerns relating to development and its associated impacts.

While not assessed in detail, any social value that attaches to the site is considered likely to be at a local, rather than Territory level.

In order to confirm the extent and nature of any such social value, any future community consultation project should include an investigation of this issue.

7.7 Assessment against the ACT Heritage Significance Criteria

The following table contains an assessment against the ACT Heritage Significance criteria, drawing on the preceding analysis and assessment.

Criterion	Comment
(Criterion A) It demonstrates a high degree of technical or creative achievement (or both), by showing qualities of innovation, discovery, invention or an exceptionally fine level of application of existing techniques or approaches.	Does not meet criterion. None of the kiln types on the site were innovative in terms of their design at the time of construction.

¹⁹² Yarralumla Neighbourhood Plan, 2004, p. 31.

¹⁹³ Yarralumla Neighbourhood Plan, 2004, p. 33.

Criterion	Comment
(Criterion B) It exhibits outstanding design or aesthetic qualities valued by the community or a cultural group.	Meets criterion at a local and Territory level. The site has a distinctive industrial aesthetic deriving from the robust and distinctive industrial building forms and their materiality, combined with the visual qualities of the quarry and the open landscape character of its setting. The 1953 chimney is a local landmark.
(Criterion C) It is important as evidence of a distinctive way of life, taste, tradition, religion, land use, custom, process, design or function that is no longer practised, is in danger of being lost or is of exceptional interest.	Meets criterion at a Territory level. The complex is an unusually complete large-scale urban brickworks of the twentieth century, comparing well with other examples in other states. Despite the removal of most of the manufacturing plant, the buildings and other site elements and the layout of the site combine to demonstrate aspects of the processes and operations common to large scale brickworks.
(Criterion D) It is highly valued by the community or a cultural group for reasons of strong or special religious, spiritual, cultural, educational or social associations.	Not investigated in detail in this CMP. Assumed to meet this criterion at a local level.
(Criterion E) It is significant to the ACT because of its importance as part of local Aboriginal tradition.	Not investigated.
(Criterion F) It is a rare or unique example of its kind, or is rare or unique in its comparative intactness.	Meets criterion at a Territory level. The continuous kilns represented on the site are part of a relatively small group surviving in a national context. The Staffordshire kiln is the only known example of this particular design of continuous kiln in Australia. See also comment above against Criterion C. The site is an unusually complete complex of its type.
(Criterion H) It has strong or special associations with a person, group, event, development or cultural phase in local or	Meets criterion at both a Territory and local level. The Commonwealth Brickworks was the

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Criterion	Comment
national history.	<p>first manufacturing facility commissioned for and constructed in the Australian Capital Territory. It was developed specifically to facilitate the construction of the Federal Capital.</p> <p>The brickworks is of historical significance in providing tangible evidence of the establishment of the city following the decision to construct the National Capital in the Yass-Canberra district in October 1908. Subsequent phases in the development of the brickworks, until its closure, reflect the broader political context that determined the ebb and flow of the construction of the Federal Capital, with major phases of the development in the 1920s and post-World War II period.</p> <p>At a local level the site has been a major determinant in the physical and historical development of the suburb of Yarralumla. It also had a long history as a major employer in the local area.</p>
(Criterion I) It is significant for understanding the evolution of natural landscapes, including significant geological features, landforms, biota or natural processes.	<p>Meets the criterion at a Territory level.</p> <p>The Brickworks site is of scientific (geological) significance as the type locality for the Yarralumla Formation, a major sedimentary sequence dating from the Silurian Period, 424-423 million years ago. The rock units at the site provide the reference section for comparison of other outcrops within the Yarralumla Formation and in this context are of both research and educative value.</p>
(Criterion J) It has provided, or is likely to provide, information that will contribute significantly to a wider understanding of the natural or cultural history of the ACT because of its use or potential use as a research site or object, teaching site or object, type locality or benchmark site.	<p>Meets the criterion at a Territory level.</p> <p>Refer to comments above in relation to Criterion I.</p> <p>The rock units at the site provide the reference section for comparison of other outcrops within the Yarralumla Formation and in this context are of both research</p>

Criterion	Comment
	and educative value.
(Criterion K) The place exhibits unusual richness, diversity or significant transitions of flora, fauna or natural landscapes and their elements.	Not investigated.
(Criterion L) The place is a significant ecological community, habitat or locality for any of the following: <ul style="list-style-type: none"> the life cycle of native species; rare, threatened or uncommon species; species at the limits of their natural range; or distinct occurrences of species. 	Not investigated.

7.8 Assessment against National Heritage List criteria

The following table contains an assessment against the National Heritage List criteria, drawing on the preceding analysis and assessment.

Criterion	Comment
(Criterion A) The place has outstanding heritage value to the nation because of the place's importance in the course, or pattern, of Australia's natural or cultural history.	Does not meet the criterion at the level required for the National Heritage List. The association with the early history of the Federal capital is considered to be at a Territory level. Refer to ACT Heritage Significance criterion H.
(Criterion B) The place has outstanding heritage value to the nation because of the place's possession of uncommon, rare or endangered aspects of Australia's natural or cultural history.	Does not meet the criterion at the level required for the National Heritage List. As noted, the continuous kilns are now relatively rare in a national context, and the Staffordshire kiln is the only example of its type. This rarity is, is however, not considered to elevate either the place as a whole or the kilns and their associated structures to the level of 'outstanding heritage value to the nation'. While the complex as a whole is also

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Criterion	Comment
	<p>now an unusual example of a relatively complete brickworks complex, it is not considered to meet the test of 'outstanding heritage value to the nation'.</p>
<p>(Criterion C) The place has outstanding heritage value to the nation because of the place's potential to yield information that will contribute to an understanding of Australia's natural or cultural history.</p>	<p>Does not meet the criterion at the level required for the National Heritage List.</p> <p>The rock units at the site provide the reference section for comparison of other outcrops within the Yarralumla Formation and in this context are of both research and educative value.</p> <p>The site has some archaeological potential relating to demolished structures however this is considered to be of limited significance.</p> <p>The place has research potential in terms of further understanding of the technologies and processes related to brickmaking. This could be explored further through a project involving oral history and historical research related to the place.</p>
<p>(Criterion D) The place has outstanding heritage value to the nation because of the place's importance in demonstrating the principal characteristics of:</p> <ul style="list-style-type: none"> • a class of Australia's natural or cultural places; or • a class of Australia's natural or cultural environments. 	<p>Does not meet the criterion at the level required for the National Heritage List.</p> <p>The complex is an unusually complete large-scale urban brickworks of the twentieth century, comparing well with other examples in other states, however, this not considered to be at a level indicative of 'outstanding heritage value to the nation'.</p> <p>Refer to ACT Heritage Significance Criterion C above.</p>
<p>(Criterion E) The place has outstanding heritage value to the nation because of the place's importance in exhibiting particular aesthetic characteristics valued by a community or cultural group.</p>	<p>Does not meet the criterion at the level required for the National Heritage List.</p> <p>Refer to ACT Heritage Significance Criterion B above.</p>

Criterion	Comment
(Criterion F) The place has outstanding heritage value to the nation because of the place's importance in demonstrating a high degree of creative or technical achievement at a particular period.	Does not meet criterion. None of the kiln types on the site were innovative in terms of their design at the time of construction and there are no other aspects of the place which demonstrate a high level of creative or technical achievement.
(Criterion G) The place has outstanding heritage value to the nation because of the place's strong or special association with a particular community or cultural group for social, cultural or spiritual reasons.	Not investigated in detail in this CMP. Assumed to meet this criterion at a local level.
(Criterion H) The place has outstanding heritage value to the nation because of the place's special association with the life or works of a person, or group of persons, of importance in Australia's natural or cultural history.	Does not meet criterion.
(Criterion I) The place has outstanding heritage value to the nation because of the place's importance as part of Indigenous tradition.	Not assessed in this CMP.

7.9 Statement of significance

The Statement of Significance for the site in the ACT Heritage Register has been reviewed and a new statement has been prepared.

Operational from 1913 to 1976, the Canberra Brickworks is of historical significance at a state / territory level as the first industrial manufacturing facility within the ACT, and for its integral role in providing the base material used in the construction of the early buildings in the National Capital. The Canberra Brickworks is one of a small group of remnant industrial and engineering heritage places that were built to facilitate the initial development of Canberra, with the other key sites being the Cotter Dam and Pumping Station and the Kingston Power House.

The site is also of local historical significance for its role in the early history and subsequent development of the suburb of Yarralumla. It has been a major presence in the suburb and has had a significant influence on its physical development. It has also been a major employer in the local area. More recently, the site has been the focus of local interest and action and broader community sensitivity in relation to its future management and development and in this context is considered of some social value at the local level.

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The quarry is of scientific (geological) significance at a state / territory level as the type locality for the Yarralumla Formation, a major sedimentary sequence dating from the Silurian Period, 424-423 million years ago. The rock units at the site provide the reference section for comparison of other outcrops within the Yarralumla Formation and in this context are of both research and educative value. Sites A and D show excellent examples of anticline in calcareous siltstone and Site B shows a typical tuffaceous mudstone and siltstone of the Yarralumla Formation. Site C shows abundant fossils of mainly brachiopods, trilobites and crinoids preserved in a bedding plane.¹⁹⁴

The Canberra Brickworks site as a whole is of historical and scientific (technological) significance for its ability to demonstrate aspects of the process of brick production in the twentieth century. While individual brickworks varied in their layout and building forms, including variations in kiln types, there were common elements and building types and the majority of these (ranging in date from 1915 to the 1970s) are represented in some form or another at this site. When compared with other surviving complexes, the Canberra Brickworks retains a relatively wide range of production and ancillary buildings, though crusher houses, power houses and the like also remain on a number of other former brickworks sites. Conversely, the Yarralumla site has had virtually all the specific brickmaking plant and machinery removed, greatly diminishing its ability to demonstrate key aspects of the brickmaking process and the associated technologies.

The individual kilns themselves are of varying levels of technological interest and significance as examples of kiln design. The Staffordshire kiln (completed 1915) is the only known example in Australia of this particular type. It is distinguished by a relatively complex system of dampers and flues which offered more control and flexibility than earlier types and which was thought to particularly suitable to the Canberra context, where a range of different products might be required. The Hardy-Patent kilns are considered to be of a lesser order of technological significance, though they are of interest as an example of a patented variation on the Hoffman kiln design originating from the late nineteenth century. A number of examples exist in Australia of Hoffman and patent kilns dating from the first half of the twentieth century. The three downdraught kilns are of limited technological interest. They are very late examples of this type of intermittent kiln design and there are numerous other and earlier examples surviving elsewhere.

The place is of aesthetic significance for its combination of distinctive and robust industrial building forms and the open landscape quality and striking rock outcrops of the quarry. The understated siting of the complex and the relatively open landscaped nature of its setting contribute to a sense of remoteness from the urban environment which is distinctive and imparts a particular aesthetic quality experienced from

¹⁹⁴ Register of the National Estate entry for Yarralumla Brickworks (extended area), Denman St, Yarralumla, ACT, Australia (file no. 101439).

ASSESSMENT

within the site. The 1953 chimney is of aesthetic significance as a landmark in the local area.

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8.0 CONSERVATION POLICY AND MANAGEMENT PLAN

8.1 Introduction

This conservation policy is based on the preceding assessment of the significance of the Canberra Brickworks. It has been developed with an understanding of:

- The heritage values of the complex;
- The relative contribution of the individual elements within the complex to these heritage values; and
- Statutory and other constraints.

The intention of the conservation policy is to provide direction and guidance on future use, conservation and physical management of the brickworks; and to inform consideration of potential future change and adaptation works,.

As relevant, the conservation policy also has regard for the land adjacent to the brickworks.

The chapter includes significant fabric and conservation focussed policies including those relating to the care and conservation of significant fabric, maintenance and repairs, retention of significant heritage values, and adaptation and site development issues.

The chapter also includes policies that address matters relating to the management of the place including statutory frameworks and other matters of a more practical nature which have the potential to impact on heritage significance and values.

8.2 Policy objectives

The principal objectives of the conservation policy are:

- The conservation (preservation, restoration, reconstruction and adaptation) of fabric of core and supporting significance, within a policy framework that is robust, easily understood, and consistent in its approach;
- To ensure that future works to the site are compliant with Burra Charter principles and responsive to the statutory heritage constraints;
- To maintain an understanding of the original function of the site;
- In support of a sensitive approach to potential future change and the implementation of an adaptive reuse and redevelopment strategy that is both feasible and will support the long-term conservation of the core heritage values of the place.

8.3 Implications of the assessment of significance

The assessment of significance for the Canberra Brickworks in this CMP has identified a number of values that relate to and are expressed by the site and complex as a whole. It has also identified values which are embodied in and/or expressed by particular elements or groups of elements within the complex. In developing the conservation policy consideration has been given to these different values and their expression through particular site elements and the complex as a whole. These are summarised in the following table.

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Value	Level	Key related elements
<i>Historic</i>		
<ul style="list-style-type: none"> • Role in the early history of Canberra • Commonwealth brickworks – first Territory based industrial facility 	State/Territory	Pre-1940 buildings and features, including quarry.
<ul style="list-style-type: none"> • Role in the history of the local Yarralumla area 	Local	<p>Primary focus is on the pre-1940 buildings and features.</p> <p>Archaeological evidence relating to early demolished buildings and structures.</p>
<i>Scientific</i>		
<ul style="list-style-type: none"> • Geological 	State/Territory	Quarry, with particular reference to identified geological features.
<ul style="list-style-type: none"> • Technological 		
Kiln design	State/Territory	<p>Staffordshire kiln</p> <p>Hardy patent kilns</p>
Extensive surviving brickworks complex	State/Territory	<p>Overall complex including quarry, does not include post-1970s buildings.</p> <p>Archaeological evidence relating to early demolished buildings and structures.</p>
<i>Aesthetic</i>		
<ul style="list-style-type: none"> • Industrial complex 	<p>State/Territory</p> <p>Local</p>	<p>Key production buildings (kilns, chimneys, machinery bays, crushers, conveyor)</p> <p>Quarry</p> <p>1953 chimney</p>
<i>Social</i>		
<ul style="list-style-type: none"> • Focus of local interest and action and broader community sensitivity 	Local	Entire complex
<i>Spiritual</i>	N/A	N/A

Number	Element
01	Quarry
02	Concrete retaining wall
03	Power House
04	Staffordshire Kiln (Kiln 1)
05	Fan house for Kiln 1
06	Chimney stack for Kiln 1
07	Offices
08	Hardy patent Kiln (Kiln 2)
09	Fan house for Kiln 2
10	Chimney stack for Kiln 2
11	Amenities block
12	Hardy patent Kiln (Kiln 3)
13	Chimney stack for Kiln 3
14	Machine Bay I for Kiln 1
15	Machine Bay II for Kiln 2
16	Machine Bay III for Kiln 3
17	Workshop
18	Small Crusher House (Crusher House I)
19	Large Crusher House (White pan room / Crusher House II)
20	Primary Crusher House (Crusher House III)
21	Elevator / Conveyor
22	Downdraft Kilns (Kiln 4-6)
23	Downdraft kiln control room
24	Chimney stack for Kilns 4-6
25	Toilet block
26	Amenities block
27	Substation/control room
28	Boiler house
29	Ancillary storage building
30	Remnant of Extrusion plant (concrete pad)
31	Ancillary storage building
32	Storage shed
33	Model railway workshop
34	Model railway storage shed



Figure 194. Site plan showing location of elements

8.4 Significant site elements

Given the multiple values associated with the site, it is recognised that in addressing the conservation policy objectives, there will be options for future management, including for restoration and reconstruction, demolition, adaptation and site development.

It is also recognised that various elements can be identified on the basis of their role in the history, operation and development of the place and/or on the basis of their contribution to particular values associated with the place or with the individual elements themselves.

The elements have variously been identified as 'core' or 'supporting' elements, and 'incidental' elements (Figure 195). These designations recognise that:

- A group of elements is associated with the establishment and operation of the Canberra Brickworks in the period 1915-1940. These elements are central to an understanding and appreciation of the operation and history of the site in this early period including its relationship with the early history and development of Canberra. These are generally designated as core elements.
- A number of elements are of individual scientific (geological or technological) significance in their own right. These have also been designated as core elements.
- A group of elements relate to the further development of the brickworks complex as it was expanded and evolved from the 1940s through to the 1970s and are able to demonstrate aspects of this expansion and the operation of the site in this period. These elements are generally designated as supporting elements.
- A further group has been designated as incidental elements. This group comprises buildings of the post-WWII period which while related to the expansion of the complex, were originally minor in nature, reflect ancillary uses rather than core manufacturing processes and/or are altered. In addition this group includes a small number of buildings that were introduced to the site following its closure as a brickworks.

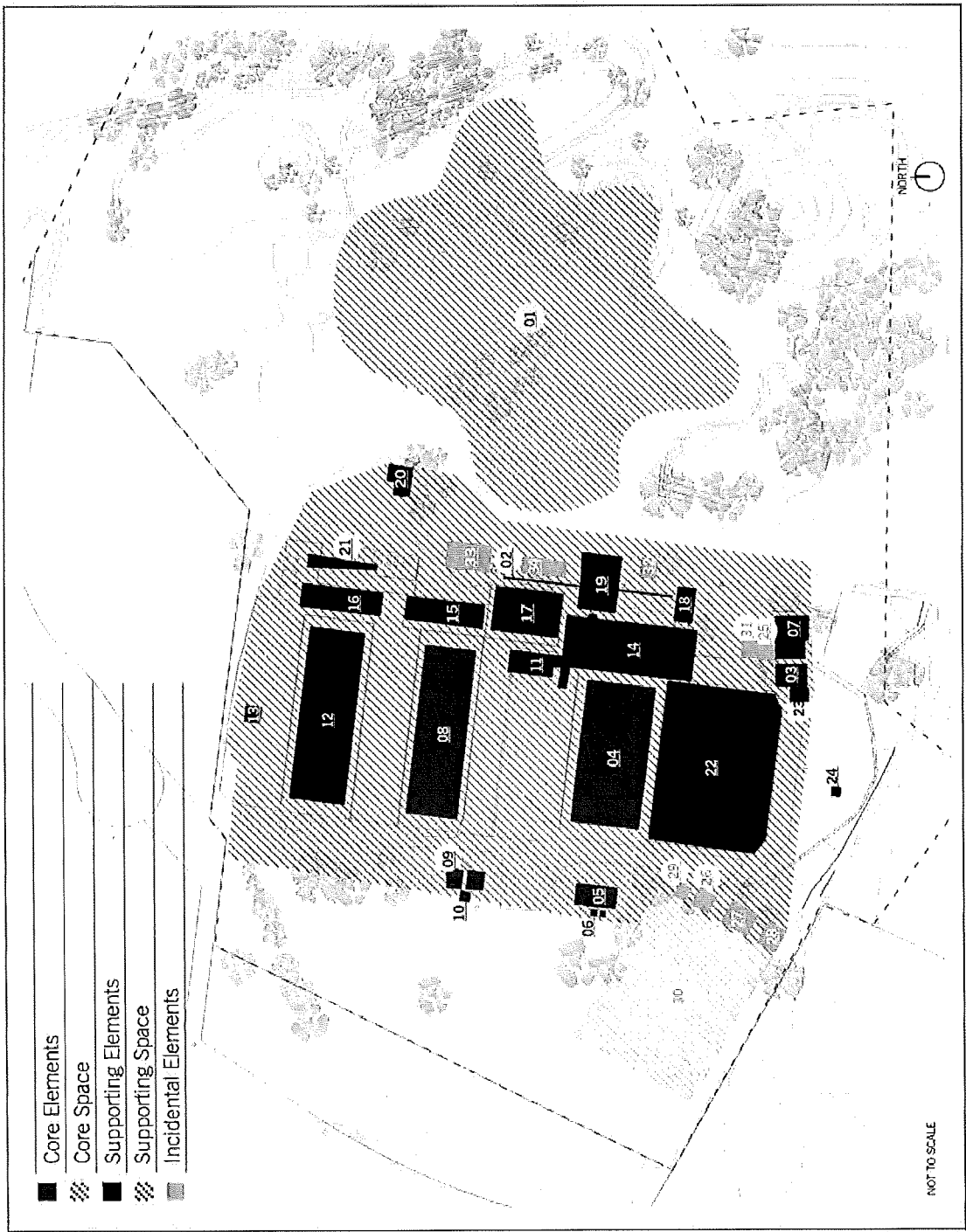


Figure 195 Significant site elements

CONSERVATION POLICY

8.4.1 *Core elements*

All surviving fabric associated with the establishment and expansion phases of development on the site, including the following site elements:

No.	Name/Description	Phase	Date of construction
01	Quarry including exposed geological features	Establishment (1911-1920)	Shale extraction from 1913
02	Concrete retaining wall	Establishment (1911-1920)	1915
03	Power House	Establishment (1911-1920)	1915-16
04	Staffordshire kiln and associated underground workings	Establishment (1911-1920)	1914-15
05	Fan house for Staffordshire kiln	Establishment (1911-1920)	1914-15
06	Chimney stack for Staffordshire kiln	Establishment (1911-1920)	1914-15
08	Hardy patent kiln I and associated underground workings	Expansion (1921-1940)	c. 1926, c. 1955
09	Fan house for Hardy patent kiln I	Expansion (1921-1940)	c. 1927, c.1955
10	Chimney stack for Hardy patent kiln I	Expansion (1921-1940)	c. 1927
12	Chimney stack for Hardy patent kiln II	Post-war phase (1944-1976)	c. 1953, c. 2005
unnumbered	Original brickyard area between Staffordshire and Hardy patent kiln I kilns and around fan houses	Establishment (1911-1920)	c.1911-1927

In addition to these elements, there is potential for archaeological evidence to survive of a range of early buildings and site elements associated with the earlier phases of development on the site, notably the Brickworks Camp, the quarry tramway, and the light railway from the site to the city. Some of these features were located on land outside the current boundaries of the site. The archaeological potential, both of the subject site and the abutting sites, requires further assessment (refer to Policy 8.6.7).

Quarry (01)

The quarry dates from the establishment of the Brickworks and demonstrates a key aspect of the original brick making operation and as it existed up until c. 1940.

The quarry is also considered to be of scientific (geological) significance as the type locality for the Yarralumla Formation, a major sedimentary sequence dating from the Silurian Period, 424-423 million years ago. The rock units at the site provide the reference section for comparison with other outcrops within the Yarralumla Formation and in this context are of both research and educative value.

Concrete retaining wall (02)

The concrete retaining wall is an early feature of the site and is demonstrative of the planning and operation of the site in this first phase.

Power house (03)

The Power House is associated with the earliest phase of the permanent brickworks and was a key element in the development of the site, providing power to the site after the Kingston Power House came on line in 1915.

The provision of continuous power supply was fundamental to the operation of the plant.

Staffordshire kiln including associated underground workings, fan house and stack (04, 05, 06)

The Staffordshire kiln together with its associated structures and underground workings is an element of core significance. It was the first permanent kiln structure on the site and is a key surviving element from the earliest phase of development. The choice of this relatively elaborate kiln type with its capacity to fire multiple types of products simultaneously reflected the requirements of the brickworks as the sole provider to the new national capital. While extensively modified and rebuilt in some areas, this kiln is the only example of a Staffordshire kiln remaining in Australia.

The fan house and stack were both integral to the operation of the Staffordshire kiln. While only remnants of dismantled equipment remain in the fan house, the arrangement of the interior demonstrates the function of the building and its relationship to the kiln and the associated chimney.

Hardy patent kiln 1 and associated underground workings, associated fan houses and stack (08, 09, 10)

Together with its fan houses and chimney (Buildings 9 and 10), the Hardy patent kiln demonstrates the expansion of the works in the 1920s in response to the increased demand for building materials for the development of the National Capital in this period. The kiln was commissioned prior to the relocation to Canberra of the Australian Parliament in May 1927. The kiln has been extensively modified and extended (including extensive rebuilding) but still provides an important link to this phase in the history of the site.

The Hardy patent kiln is also of interest as an example of an Australian patent kiln design thought to date from the late nineteenth century, one of a large number of variations of the Hoffman kiln typology developed in this period.

The associated fan houses and stack are integral to the operation of the kiln, including in its expanded form post-WWII.

Original brickyard (between the Staffordshire kiln and Hardy patent kiln I, unnumbered)

The open yard area between the two earlier kilns historically was the early brickyard and was a key space within the complex. It demonstrates key aspects of the layout of the site and its operation.

8.4.2 *Supporting elements*

Supporting elements include those key structures associated with the expansion of the manufacturing plant in the post-WWII period, which demonstrate the pattern of this expansion, the arrangement of various elements of the process across the site, and aspects of the brickmaking process itself. Minor non-specific process or ancillary buildings have not been included. The heavily modified office building of c.1925 has also been included in this group.

Supporting elements are as follows:

No.	Name/Description	Phase	Date of construction
07	Offices	Expansion (1921-1940)	c. 1925 with extensive alterations and additions
11	Amenities block	Post-war phase (1944-1976)	c. 1950, c. 1977
12	Hardy patent kiln II and associated underground workings	Post-war phase (1944-1976)	c. 1953
14	Machine Bay I for Staffordshire kiln	Post-war phase (1944-1976)	c. 1955
15	Machine Bay II for Hardy patent kiln I	Post-war phase (1944-1976)	c. 1955
16	Machine Bay III for Hardy patent kiln II	Post-war phase (1944-1976)	c. 1955
17	Workshop	Post-war phase (1944-1976)	1955
18	Small Crusher House (Crusher House I)	Post-war phase (1944-1976)	c. 1958
19	Large Crusher House (White pan room/ Crusher House II)	Post-war phase (1944-1976)	c. 1955
20	Primary Crusher House (Crusher House III)	Post-war phase (1944-1976)	c. 1955
21	Elevator / Conveyor	Post-war phase (1944-1976)	c. 1955

No.	Name/Description	Phase	Date of construction
22	Downdraught kilns (3) and associated underground workings	Post-war phase (1944-1976)	c. 1960-3
23	Downdraught kiln control room	Post-war phase (1944-1976)	c. 1963
24	Chimney stack for Downdraught kilns	Post-war phase (1944-1976)	c. 1950s
unnumbered	Expanded brickyard	Post-war phase (1944-1976)	(1950s-1970s)

Offices (07)

While the original section of the office building is associated with an early phase of development at the site, the building has been extensively modified and overbuilt, the result being the original form is substantially obscured.

Amenities block (11)

The amenities block was constructed as part of a major consolidation and expansion of the brickworks in the 1950s and reflects the need to provide improved facilities for workers on site.

Hardy patent kiln II and chimney stack (12 and 13)

The second Hardy patent kiln together with its underground workings and associated chimney stack are key elements of a major expansion and upgrade of the Brickworks during the 1950s, along with the new crusher houses, grinding facilities, automatic conveyors, new brick presses and machine bays. The construction of this kiln greatly expanded the production capacity of the works. The kiln is relatively intact, including when compared with the earlier Hardy patent kiln on this site and is a good representative example of this typology of continuous kilns.

In addition to its role as a key element in the post-WWII expansion of the Brickworks, the 1953 chimney for the Hardy patent kiln is also of aesthetic significance as a prominent element in the immediate vicinity and a marker for the site. While not prominent in these views, it is also visible more distant views from the north shore of Lake Burley Griffin and Black Mountain.

Machine bays I, II and II (14, 15, 16)

Replacing earlier structures in this general area of the site (between the kilns and the quarry), the Machine Bays present as a series of utilitarian steel-framed and clad process buildings constructed as part of the post World War II expansion and modernisation of the complex. The form and siting of these related structures and the conveyor that connects them demonstrate important aspects of the historical pattern and layout of the complex. Despite the removal of the majority of the equipment including the brick presses, the Machine Bays also demonstrate aspects of the brick making process in the post-WWII period.

Workshop (17)

Replacing earlier structures in this general area of the site (between the kilns and the quarry), the Workshop is one of a series of utilitarian steel-framed buildings constructed as part of the post World War II expansion and modernisation of the complex. The form and siting of these related structures and the conveyor that connects them demonstrate important aspects of the historical pattern and layout of the complex. While not a process building *per se*, the Workshop performed a key function in the operation of the complex.

Crusher houses (18, 19, 20)

Along with the Machine Bays, the three related crusher houses were new process buildings constructed as part of the post World War II expansion and modernisation of the complex. The form and siting of these related structures demonstrate important aspects of the historical pattern and layout of the complex. Despite the removal of most of the equipment, the form of the buildings and the various remnant hopper and other elements internally also reflect aspects of the brickmaking process in the post-WWII period. In the case of the Primary Crusher House, following the demolition of both the conveyor structure and the Red Pan Room, which interconnected the Primary Crusher House with the Machine Bays and the conveyor 'spine' which served the brick presses, the subject building is now somewhat isolated from these related buildings. Despite this, it is still demonstrative of its original function and role in the process.

The White Pan Room is a particularly prominent site element, with its collection of skillion roofed forms rising above the machine bays.

Elevator/Conveyor (21)

The Conveyor was an integral element in the transport and refining of raw material from the Primary Crusher House (Building 20) to the brick kilns.

While much of the fabric of this structure is missing and it is in a semi-derelict condition, the remaining portion demonstrates aspects of the layout and sequence of processes on the site.

Downdraught kilns and associated underground workings, control room and chimney (22, 23, 24)

The downdraught kilns are part of the evolved brickworks complex and date from one of the last phases of expansion on this site. They contribute to an understanding of the operation of such complexes; in this case the choice of downdraught kilns appears likely to have been made on the basis of their suitability for specialist lines.

The kilns are of limited interest in their own right; they are relatively late examples and there are many surviving elsewhere.

The downdraught kilns are supporting elements on the site.

Expanded brickyard (unnumbered)

As for the earlier brickyard, the spaces around and between the key process buildings, considered to represent the expanded brickyard, are important features of the planning and layout of the complex and therefore, the processes that occurred there. Of particular importance is the open space between the Hardy patent kilns.

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8.4.3 *Incidental elements*

Incidental elements include a series of relatively minor ancillary and service buildings of the post-WWII period. This group also includes buildings associated with the extrusion plant on the basis the plant itself has been demolished. It also includes buildings constructed following the closure of the brickworks. A number of these buildings are typical of the support functions found on any industrial site and do not inform about the process.

No.	Name/Description	Phase	Date of construction
25	Toilet block	Post-war phase (1944-1976)	c. 1960s
26	Amenities block	Post-war phase (1944-1976)	c. 1960s
27	Substation/control room	Post-war phase (1944-1976)	c. 1971
28	Boiler house	Post-war phase (1944-1976)	c. 1971
29	Ancillary storage building	Post-war phase (1944-1976)	c. 1971
30	Demolished slab for extrusion plant	Post-war phase (1944-1976)	c. 1971
31	Ancillary storage building	Post-war phase (1944-1976)	c. 1960s
32	Storage shed	Post-war phase (1944-1976)	c. 1960s
33	Model railway workshop	Post-closure phase (1976-2009)	c. 1979
34	Model railway storage shed	Post-closure phase (1976-2009)	c. 1979

8.5 **Options for the management of core and supporting elements**

8.5.1 *Discussion*

One of the primary heritage objectives for this site is the establishment of a viable future use that will ensure its physical conservation and the retention of key heritage values in the long term. It is often difficult to establish a viable long-term use for such industrial sites and this is reflected in the varying approaches and outcomes that have occurred on such sites, including redundant brickworks in New South Wales, Western Australia, South Australia and Victoria. As evidenced in some of these projects, achieving a sustainable and meaningful heritage outcome in the context of major redevelopment is challenging.

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The two key questions in assessing any adaptive reuse/redevelopment proposal for this and other similar sites are:

- what is the impact of the proposal on the cultural heritage significance of the heritage place?; and
- what is a reasonable and economic use of the heritage place?

The buildings on this site are generally in fair to poor condition and some are in a relatively advanced state of decay. Any adaptive reuse proposal for this site which involves the substantial retention and conservation, repair and refurbishment and adaptation of significant fabric so as to maintain the heritage values of the place will also involve substantial cost, both up-front and ongoing. These costs ultimately will be required to be assessed against the positive heritage outcomes and the investment in the cultural capital embodied in the site, but also against an economic return that is generated by a new use or uses. In this case they may also include consideration of the ability to generate funds to support active conservation of the heritage place which can be generated by peripheral and associated development.

On this basis and having regard to the assessed significance of the place, the conservation policy recognises that there are two broad approaches that reasonably could be contemplated. Both involve intervention by way of new development and adaptation of retained buildings, recognising that both actions are likely to be required if a feasible reuse strategy for this site is to be realised.

The two options are consistent in many respects but vary in the extent of demolition and site development contemplated, and (albeit to a lesser degree), the approach to adaptation of retained buildings.

The two options are summarised below.

In providing the summary, it is noted that clearly within these options there is scope for variations in approach to specific issues. For example, while both options propose the adaptation of the retained buildings, the specific approach to adaptation could be varied within the parameters of the conservation policies in this document. Similarly, both options also contemplate a level of site development; again, the CMP allows for scope for variations in the approach to this issue.

The general conservation policies in this CMP apply equally to both options. Where appropriate, reference to the options is made in specific policies, including policies for specific site elements.

8.5.2 *Option 1 - whole of site conservation*

Option 1 focuses on the conservation of the complex as a whole as was developed to the 1970s. This option prioritises not only the heritage values that are embodied in the pre-1940 fabric of the place, but relative to Option 2 following, also seeks to conserve the evolved form of the complex and its ability to demonstrate aspects of the brickmaking process as it occurred in the later phases of the site's operational history.

Option 1 contemplates the retention of all buildings of core and supporting significance, including all of the kilns, together with their associated fan houses and chimneys. The lighter-weight process buildings (Machine Bays and Crusher buildings) to the east of the kilns would also be retained. Recognising the majority of plant specific to the brickmaking process

(presses, crushers and the like) has been removed from the site, preferably this option would also include retention of the limited remaining plant (conveyors and hoppers) in the Machinery Bays and Crusher Houses. This plant suggests the movement of the crushed materials through this area, and down to the brick pressing area.

In this option the preference would also be to retain the 1950 amenities building on the basis it reflects the broader operation of the site, though this would be a lesser priority relative to the retention of the process buildings.

The original and expanded brick yard area would be retained as open area with limited scope for the insertion of new buildings.

The quarry would be retained, sufficient to demonstrate its significant geological features, as well as its general form and relationship to the building complex and role in the process.

This option contemplates the internal adaptation of the kiln, process and other retained buildings, within the parameters described in the building-specific policies for these elements. In the case of the Machine Bays any internal adaptation would be constrained by the retention of the plant and equipment at the upper level.

This option contemplates a level of site development as identified in the Site Development policies at 8.6.12.

Heritage impact

Option 1 is directed at the retention of all buildings and site elements identified as of cultural heritage significance (core and supporting) and would result in an outcome that should maintain the key heritage values associated with the site. It would allow for the adaptation within certain constraints of individual buildings and for site development. It could be expected that the most compatible uses if such an approach were adopted would be low level industrial and commercial uses, particularly in the core elements, which could largely make use of the existing fabric without extensive intervention.

8.5.3 *Option 2 - partial site conservation*

Option 2 focuses on the core elements as identified in the Conservation Management Plan. The objective in this option is to conserve those elements that relate to the earlier phase of development of the Brickworks and/or that are of a high order of significance in their own right.

This option would retain and conserve two of the three kiln types on the site:

- Staffordshire kiln (Kiln 1, 1915) and associated fan house and chimney
- Hardy patent kiln (Kiln 2, c. 1926) and associated fan house and chimney

It would also retain the original Power House (1915-16).

As for Option 1, the quarry would be retained, sufficient to demonstrate its significant geological features, as well as its general form and relationship to the building complex and role in the process.

The 1953 chimney, which has been identified for its landmark qualities both in the local area and to a degree in the wider area of central Canberra, would also be retained in this option.

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Either demolition or a more interventionist adaptation of the balance of the process and ancillary buildings on the site, including those buildings identified as supporting elements, could be contemplated in this option.

The internal adaptation of the kilns and other retained structures could occur within the parameters described in the building-specific policies for these elements.

This option contemplates a greater level of site development as identified in the Site Development policies at 8.6.12.

Heritage impact

Option 2 could result in the loss of a number buildings and elements identified as supporting elements. It is noted that the completeness of the complex as a brickmaking plant is already compromised by the demolition of some building elements and the removal of the main manufacturing plant (crushing and pressing machinery). The demolition of the supporting elements, which generally date from the mid- to late- twentieth century, would further diminish the ability of the complex to demonstrate the manufacturing processes that occurred on this site in the later phase of its history.

The other heritage values associated with the complex would generally be retained in this option. Those elements which remain from the establishment and expansion phases of the site's history would be retained - including the two kiln types of most interest in terms of their technology and rarity (the Staffordshire kiln and the Hardy patent kiln) - along with the quarry itself (refer Figure 196). This early grouping would demonstrate key aspects of the layout of the site and the process as it occurred in the period (1913-1940). This period has been assessed as of most historical significance both in the local context and in terms of the associations with the establishment of Canberra. As for Option 1, the scientific (geological) values of the place would be maintained.

The Option 2 approach is the one which has typically been applied on other brickworks and related industrial sites where the development balance has required more wholesale site clearance. Retained fabric has either been heavily adapted and modified or retained and presented as an industrial archaeological artefact.

8.5.4 *Conclusion*

The choice of one option over another will be the outcome of the consideration of many factors and ultimately determined by those responsible for approving works. While this report focuses on the heritage issue, the reality of a site of this nature is that many other forces will come into play in finding a balanced outcome. The fact that the site has remained in a semi-derelict and gradually decaying state for some decades reflects the challenge of such sites. The scale of the site and nature of the fabric will inevitably require a level of intervention that will change the physical and visual nature of the place. The intent of the options approach is to provide points between which a solution needs to be found if heritage is to be meaningfully addressed.



Figure 196 View west of the complex in 1929, including part of the quarry, the kilns and their stacks (albeit the Staffordshire kiln obscured), and the office and Power House (on left). The original crushing and pressing buildings (now demolished) are in the centre of this view, to the left of the Hardy patent kiln and in the background (far left) is the Brickworks Camp complex, now demolished. Source: National Library of Australia.

8.6 General conservation policies

8.6.1 *Setting and curtilage*

Setting

Setting is defined in the Burra Charter (Definitions, Article 1.12) as 'the area around the place which may include the visual catchment'. The Charter's Conservation Principles for 'setting' (Article 8) expand on the definition:

Conservation requires the retention of an appropriate visual setting and other relationships that contribute to the cultural significance of the place.

The original setting of the brickworks was an open pastoral area surrounded by grazing land and juvenile plantations of radiata pine. The brickworks had no urban context and remained as such until well into the interwar period (with only relatively sparse residential development at some distance from the site) and the later twentieth century when the residential development of Yarralumla took full force. Because of the relatively sunken location the brickworks was a place concealed from view and seen only when approached over the as yet not full excavated quarry or from the north and west through what are now the wooded areas of the Canberra Golf Course and Dunrossil Drive. As vegetation matured and development occurred, the brickworks increasingly became an unseen place; only

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visually evidenced by smoke from the chimney stacks and, after 1953, by the landmark chimney.

As has occurred throughout Canberra the visual setting has changed over time and while the site still exists with a treed and open grassed backdrop to the west and south, to the north and east expanding residential development provides a very much altered context.

From a heritage perspective the most distinctive aspect of the evolved setting is that the site still retains a degree of concealment and a 'removed-ness' from the character of the residential city. The setting is still one of a degree of open unkempt landscape, wooded and plantation areas, and limited visible perimeter form. Uniquely in the Australian context it is a brickworks which still conveys the sense of remoteness of the location in which it was built.

Policy 1

While the setting has contributed to a sense of isolation and a sense of discovery upon arrival, the brickworks has evolved over time with discrete additive elements located to create a bold and orthogonal spatial sequence and order. Any new development should complement the reading of the brickworks as a complex of buildings and have regard to its inherent spatial qualities

Heritage curtilage

The 'heritage curtilage' for a building, complex or site has been defined as meaning;

the area of land (including land covered by water) surrounding an item or area of heritage significance which is essential for retaining and interpreting its heritage significance. It can apply to either:

- land which is integral to the heritage significance of items of the built heritage; or
- a precinct which includes buildings, works, relics trees or places and their setting.¹

The concept of heritage curtilage recognises that on occasions there is a requirement for an expanded curtilage which goes beyond legal or other boundaries to take into account views and vistas, the visual relationship between the place and its surrounds and the need to provide a 'buffer' between the heritage elements and surrounding land. A curtilage can also provide for the conservation of the sensitive heritage values immediately surrounding the heritage place, and where appropriate, can maintain a setting of aesthetic value for the heritage place.

Having regard for the above, the two issues that arise are the inclusion within the heritage curtilage of all features and elements that contribute to the significance of the place and that of establishing an appropriate setting for the place.

¹ Heritage Office, *Heritage Curtilages*, Department of Urban Affairs and Planning, 1996, p.3.

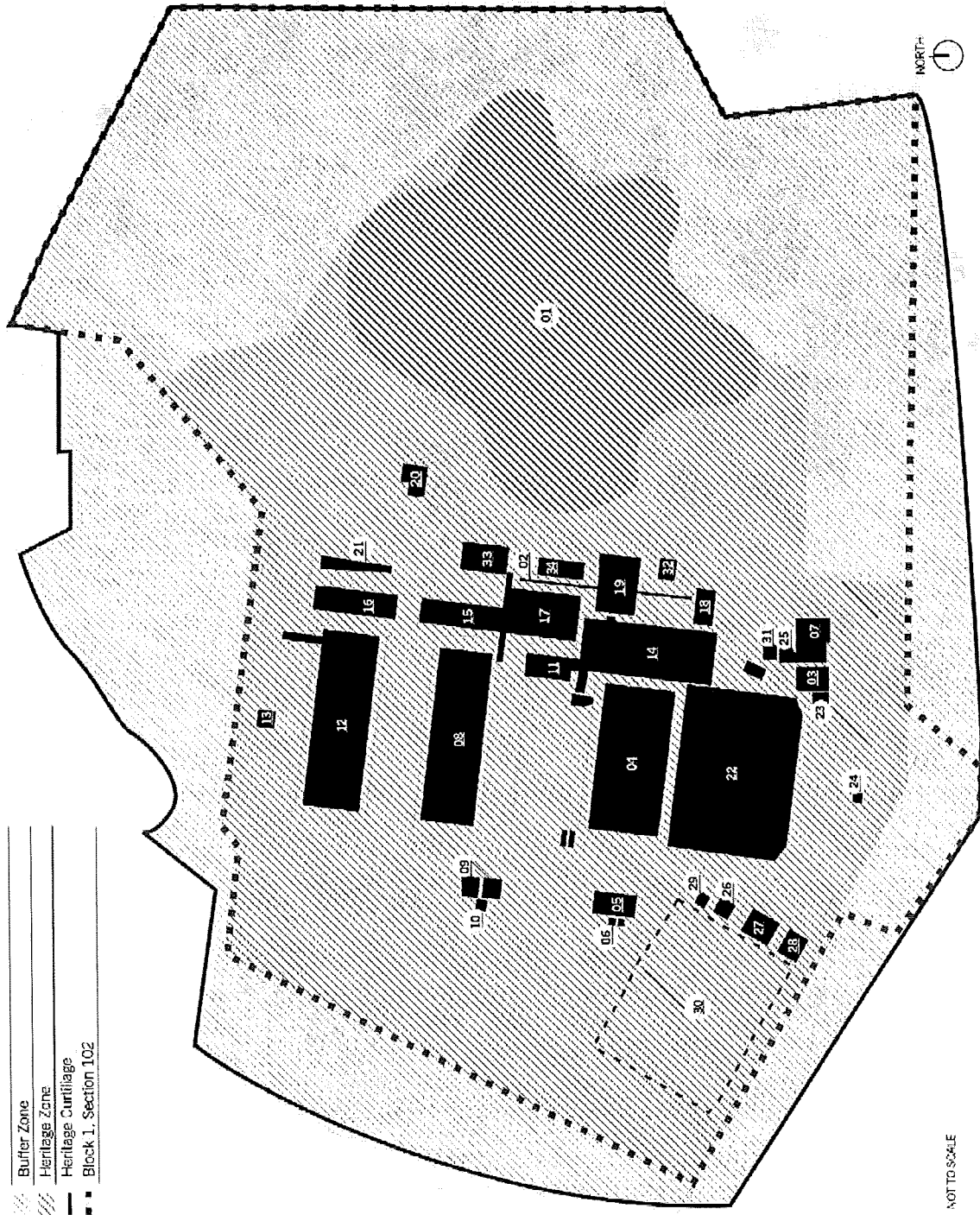


Figure 197 Heritage curtilage and management zones

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In considering the first issue, it is noted there is potential for there to be archaeological evidence of related structures such as the Married Quarters surviving outside the currently enclosed site. Such archaeological evidence, if it exists, would be of interest in documenting the history of the site and should be investigated should future works occur in this area (refer to Policy 8.6.7). In considering the nature of the assessed significance of the place as a whole, however, it is not considered necessary to include these more distant potential archaeological sites within the curtilage for the place.

In considering the broader issue of setting, the immediate surrounds of the Brickworks vary considerably. Abutting the site are the remnants of the Westbourne Wood arboretum to the west of the site, medium density housing is to the east and north of the site and to the south is the lightly treed ridge north of Dudley Street. The recent housing to the north is in close proximity and has encroached on the setting of the brickworks complex. The topography of the immediate area also varies and has a major influence in defining a setting (and heritage curtilage), particularly with reference to the potential for future development to have an impact on setting.

The current boundaries of the Brickworks site are those of the irregularly shaped Block 1, Section 102 (Figure 197). The boundaries are also those which have been used in defining the registered site. This does not reflect the original extent of the site which was larger and which was reduced in size both before and after the closure of the works in the 1970s.

As an outcome of this study a heritage curtilage has been defined which extends beyond this legal boundary and the registered land to include additional land to the north, west and south. This heritage curtilage (Figure 197) is considered to reflect appropriately the area that requires management for heritage reasons, including management of potential impacts of future development. It is recognised that this expanded heritage curtilage includes land that has been subdivided and developed and is now privately owned (to the north). Notwithstanding, it is still considered desirable that this area be considered to be part of the defined heritage curtilage and any future redevelopment consider the impact on the brickworks.

In recommending a heritage curtilage that extends beyond the current registered area (Block 1), there is no requirement to expand the extent of registration under the *Heritage Act*. Rather, it is recommended that the management of the additional land on abutting sites be through an alternative mechanism – planning overlay or similar – which includes objectives that have regard for the setting of the brickworks complex.

Management zones

In establishing a heritage curtilage for this site, it is noted that there is potential for development to occur within this curtilage, but that this should be managed appropriately having regard for any impact on the heritage values of the place and within the relevant and appropriate statutory heritage frameworks.

Given its scale, complexity and layout, it is reasonable to consider different levels of management across the heritage curtilage as a whole, and to this end, two management zones have been defined (Figure 197). The zone boundaries are soft boundaries which should be treated as indicative rather than absolute.

Primary heritage zone

The Primary Heritage Zone is the area of the site which is considered to be of the highest level of heritage sensitivity. Adaptive reuse and new works need to have particular regard to the assessed significance of the relevant element or area and heritage impacts. The Primary Heritage Zone includes the main brickworks complex and a large part of the quarry.

Buffer heritage zone

The Buffer Heritage Zone includes those parts of the site which are within the curtilage but which are more removed, visually and/or physically, from the key elements of the complex. The Buffer Heritage Zone includes areas that support the significance of the site in providing a setting. In this zone, more intensive development could be contemplated but the scale, form and spatial characteristics of this development needs to be appropriately managed having regard for any adverse impact on the place as a whole. The Buffer Heritage Zone includes substantial areas of the quarry on its eastern and southern sides and additional land to the east, north and south.

Reference is made to the management zones in the policies for Site Development and New Works (8.6.12).

<p>Policy 2</p> <p><i>The heritage curtilage for the Canberra Brickworks includes the land in Block 1, Section 102, Block 20, Section 102 and additional land to the north and south. Block 1, Section 102 should continue to be controlled under the Heritage Act. Alternative controls under the Planning and Development Act should be considered for the land to the north, west and south.</i></p> <p>Policy 3</p> <p><i>Management of land within the heritage curtilage should have regard to the identified heritage zones and for the identified significance of the subject site and complex.</i></p>

8.6.2 *Care of Significant Fabric*

All works

The Brickworks has been assessed as a place of a relatively high level of cultural heritage significance, variously at either a local or State / Territory level, for historic, scientific (technological and geological) reasons, aesthetic and social values.

The policy objectives set down in this chapter identify the approach to conserving fabric of core and supporting significance, and ensure that works to the place are compliant with Burra Charter principles. While the multiple values ascribed to the place allow for the consideration of different approaches to its conservation and adaptation, it is important that any conservation or adaptation works undertaken are in accordance with these Burra Charter principles.

This study did not involve a detailed assessment of the current condition of the significant structures and fabric on this site and such an assessment should be undertaken in order to inform future conservation and maintenance works. As a general comment, however, the physical condition of the buildings and structures varies from fair to poor, with the majority

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appearing to be in need of extensive maintenance and conservation works, ranging from replacement of cladding and the like to – in the case of a number of kilns – potentially significant structural remediation works.

Policy 5

All future conservation works which affect fabric and elements of significance (core and supporting elements) should be carried out having regard for the principles of the Australia ICOMOS Burra Charter, 1999 (see Appendix A).

Policy 6

Undertake a detailed assessment of the current physical condition of all significant fabric and use this assessment to inform all future conservation and maintenance works. Establish a priority list of works to ensure the long term conservation of the place.

General repairs and maintenance

A consistent and regular approach to the maintenance of fabric is recommended. The approach should firstly be to maintain and ensure that significant fabric does not deteriorate and secondly to conserve significant existing fabric. An ongoing cyclical inspection and maintenance program should be instigated to ensure that the significant fabric is maintained in good physical condition and its integrity is not jeopardised.

The site generally suffers from a lack of regular maintenance and is subject to sporadic vandalism. A programme of immediate repair and maintenance works should be undertaken in accordance with the recommendations of this plan (refer Appendix B).

Policy 7

Introduce an ongoing cyclical inspection and maintenance program to ensure that the significant fabric is maintained in good condition and its integrity is not jeopardised. Institute at least annual maintenance inspections and five yearly inspections to address longer term capital works.

Policy 8

Core elements should be retained and conserved.

If alterations or changes are proposed, then the works should have regard for the identified aspects of heritage significance, and should be guided by the policies and recommendations included in this report. A key consideration is the impact of any proposed change on the legibility and presentation of the complex as a whole.

Policy 9

Generally, retention of supporting elements is preferred however these elements provide greater flexibility than core elements with regard to change and alteration, particularly internally. Where alterations or changes are proposed, these should be guided by the policies and recommendations included in this report, and should have regard for the identified aspects of heritage significance both for the specific element and the values of the complex as a whole. A key consideration is the impact of any proposed change on the legibility and presentation of the complex as a whole.

Policy 10

Incidental elements typically can be retained, altered or removed. This is a general policy, however, and specific works or proposals relating to these elements, including replacement or alteration, should also have regard for policies and recommendations included elsewhere in this report which either address the specific element, or address matters to do with site presentation, new development, etc.

8.6.3 Reinstatement/ reconstruction works

The Brickworks complex is an evolved place with both core and supporting buildings and elements ranging in their construction dates between 1913 and the 1960s. In addition, the current structures have been modified, in many cases, extensively, as the complex has evolved and expanded and reflecting changes in work practices and processes on the site. In many cases, original or early openings have been altered, including enlargement of openings and in some cases, the infilling of openings. There are also buildings which have undergone significant rebuilding and in some cases inaccurate or conjectural reconstruction works (see, for example, the Staffordshire and 1927 Hardy patent kiln).

In some cases, the works that have occurred are such that they demonstrate major changes in work practices (such as the widening of the entries to the kiln chambers to allow for the use of fork lifts). In other cases, however, alterations have been made on a more ad hoc basis and do detract from the presentation and/or legibility of particular elements.

As a general principle, while reinstatement and/or reconstruction works could be undertaken, either to individual buildings or to reconstruct missing elements on the site, there is no requirement to undertake such works across the site as a whole, nor would such an approach be recommended.

Any reinstatement or reconstruction works which are proposed should be assessed against the specific recommendations for individual elements and as part of a broader strategy for site interpretation and presentation. For individual buildings there may be cases where the reversal of particular alterations or additions would improve the presentation and legibility of the building, but in all cases there is a need to ensure there is clarity about the evolved nature of the fabric. Refer also to the policy for Site Interpretation (8.6.16).

Policy 11

Any reinstatement or reconstruction works which are proposed should be assessed against the specific recommendations for individual elements in this CMP and as part of a broader strategy for site interpretation and presentation.

8.6.4 *Relocation*

The relocation of particular structures within the site would obscure an understanding of the layout and processes on this site and is not supported. The majority of supporting elements on the site are of limited significance in their own right, instead deriving their meaning and significance from their contribution to the complex as a whole.

Policy 12

Relocation of individual buildings and structures is not supported.

8.6.5 *Plant and machinery*

The majority of the brickmaking plant from this complex has been removed, including the brick presses and crushers. Surviving machinery *in situ* is generally limited to conveyers and hoppers of the post-WWII period surviving in the Machine Bays. This is not of particular interest in its own right, nor is it specific to the brickmaking process. Notwithstanding, this remnant plant and supporting structure partly demonstrates the movement and handling of crushed material from the two Pan Houses through the Machine Bays and down to the brick presses and preferably should be retained in any adaptation of these buildings.

There is also remnant equipment in the Power House, which appears possibly to be early in origins. Its retention is not required on heritage grounds.

Similarly, it is noted that the Workshop retains a gantry crane, this is unrelated to the brickmaking process itself and is not considered of any note in the context of this site.

The fan houses generally do not retain plant *per se* but there is some remnant ducting which should be retained if possible.

The firing floors of the Staffordshire and Hardy patent kilns retain remnants of the equipment used to fire and feed the chambers on the levels below. In any adaptation of these buildings, a representative area or areas of the firing floors should be retained with this equipment intact.

All underground workings related to the kiln operations should be retained; this includes flue systems and connections to the fan houses and stacks.

Elsewhere across the site there are remnant components/elements of plant and equipment still present. Generally, however, these are neither intact nor *in situ*, but rather, represent remnants of disassembled/dismantled plant left in buildings or elsewhere on site and in this context do not provide coherent evidence of specific brickmaking processes. It is also noted that the provenance of the remnant items distributed around the site - see, for example, the items in Machine Bay III - is unknown. A list of 'Artifacts/Relics' was prepared by Mr Bruce McDonald (former site caretaker) for the purposes of the 1986 Conservation Plan (refer data

sheet appendix in this document); and this list appears to include items brought onto the site from other brickworks. Some of the items on Mr McDonald’s list –not all – remain on site, though a complete inventory has not been prepared as part of this Conservation Management Plan.

Policy 13

All underground workings related to the kiln operations should be retained; this includes flue systems and connections to the fan houses and stacks.

In the event the Machine Bays are retained and adapted, the remnant conveyors and hoppers on the upper level of the building should be retained in situ.

Other remnant and/or dismantled items of plant and equipment on site should be further investigated. Where appropriate and feasible these could be retained for interpretive purposes. Where these objects are to be removed, they should be recorded (refer to 8.6.8) prior to removal.

8.6.6 *Ephemera*

While not documented in this CMP, there are a number of examples of remnant brickmaking ephemera located around the site, including painted numbers and similar within the kilns and elsewhere. All such ephemera should be retained, even in cases where its origins are unknown.

Policy 14

All brickmaking ephemera should be retained wherever possible.

8.6.7 *Archaeology*

This site has historical archaeological potential in the form of the evidence that is likely to remain of the numerous buildings and structures that are documented as having been constructed on the site but that have been demolished. Refer to the Demolished Buildings sections in Chapters 2-5 of this CMP.

While on the basis of the research undertaken for this CMP, none of this evidence is considered likely to be of a level of significance that necessarily would warrant retention in situ, or would preclude development on the site, it has the potential to provide further detail on the history and operation of the site. A predictive archaeological assessment should be prepared for the site.

Policy 15

A predictive historical archaeological assessment should be undertaken for the study area and abutting sites. This study should identify the relative potential for sub-surface remains on the site and their likely nature and significance. Depending on the outcome of such a study, an Archaeological Management Plan should be prepared prior to any development or disturbance of the site.

CONSERVATION POLICY

8.6.8 *Landscape elements*

The area surrounding the subject site has been heavily treed and still has a strong landscape quality, and landscape and tree cultivation have been important themes in the history of abutting sites. Specifically, the Commonwealth nursery and Westbourne Woods arboretum were established in the 1910s to the west of the site, and the Commonwealth Forestry School was established in 1926 to its east.

The landscape on the Brickworks site itself includes large numbers of trees scattered through and around the quarry, which appear to be mostly self-seeded conifers (species vary but predominantly *Pinus radiata*). While not investigated in detail, there may also be some consciously planted specimens in this part of the site, possibly of some age; photographs of the 1920s show what appear to be newly planted trees as well as some more mature trees on the ridge to the north-east of the site. There are other trees planted around the site, a mix of predominantly deciduous trees of varying ages. The site is infested with weeds including blackberries.

Historically, while trees appear to have been deliberately planted on the site, there is no evidence of a consciously designed landscape treatment implemented across the site, nor would one be expected on an industrial site such as this one with no public presentation. Trees are more likely to have been planted within the site for their amenity value and on a more *ad hoc* basis.

Land to the south and west has a landscape quality that contributes to the setting of the place. Refer to the policies at 8.6.

Policy 16

The existing plantings at the site are not of heritage significance. The landscaped quality of the immediate surrounds forms part of the setting of the place and should be maintained as far as possible. Refer to the policies at 8.6.

8.6.9 *Use and public access*

The Brickworks site has not been operated for the manufacture of bricks since its closure in 1976, and its cultural heritage significance does not depend on the ongoing use of the site for a brickworks or a related industrial purpose (though the latter would be an option if feasible). Proposed future uses for the site should be assessed on the basis of their feasibility and the likely nature and level of impact on the identified heritage values and significant fabric. Compatible uses are those which are not in conflict with these values or the significant fabric.

Possible future uses would include any of the following or – most likely – a combination of more than one use:

- Institutional/educational, includes potential government use
- Residential
- Retail/other commercial including office
- Tourism-related uses
- Industrial – light manufacturing – processing, storage and sales
- Arts-related uses including studio spaces and performance facilities
- Community facilities.

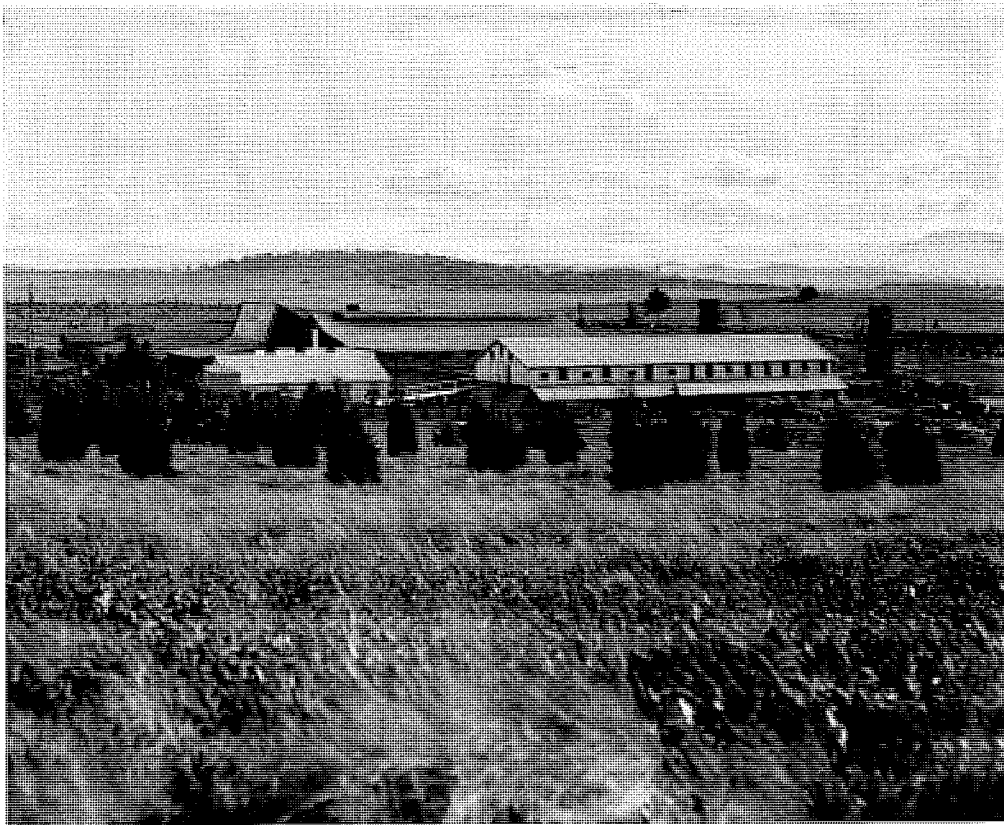


Figure 198 View of the brickworks, looking south-west toward the new Hardy patent kiln, c. 1927. Note the young conifers in the foreground.

Source: National Library of Australia

Public access into this site is not a major theme in the operational history of the place, however, parts of the site have been accessible to the public at different times in post-closure period. While not a key heritage objective, as an important heritage asset in Canberra, it would be desirable that there be some public access to at least parts of the site.

Given the scientific and educative value of the quarry as the type locality for the Yarralumla Formation, it would also be desirable that there be some public access to the quarry and its significant geological sites as identified.

Policy 17

A range of possible future uses could be considered. Future uses for the site should be assessed on the basis of their feasibility and the likely nature and level of impact on the identified heritage values and significant fabric.

It would be desirable that in any new use or uses, consideration be given to allowing public access to all or part of the site



Figure 199 Hardy patent kiln under construction, looking north-east. Note the plantings on the ridge.

Source: National Library of Australia.

8.6.10 *Views and vistas*

Notwithstanding the 1953 chimney stack provides a marker for the site in the local area and can also be viewed from more distant locations, the Canberra Brickworks site is one which overall has a relatively understated presence in the surrounding area. Views are available into the site from the abutting sites, but these are relatively incidental and of no particular heritage significance. While some urban industrial complexes of a comparable age were designed with a conscious more formal presentation to one or more street frontages, this is not the case for the Brickworks, and it is a site that is completely utilitarian in its physical/architectural conception.



Figure 200 View westward from within the quarry, late 1920s, showing the earlier machine bays and the newly constructed Hardy patent kiln on the right.
Source: National Archives of Australia

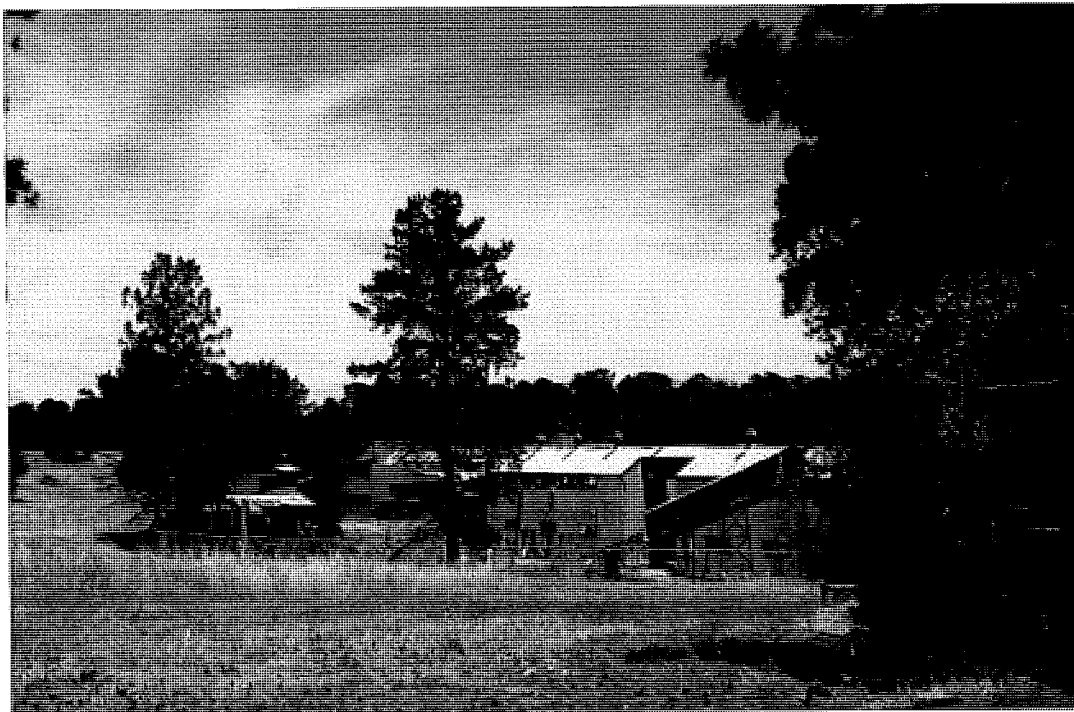


Figure 201 Current view to the south-west from within the quarry.

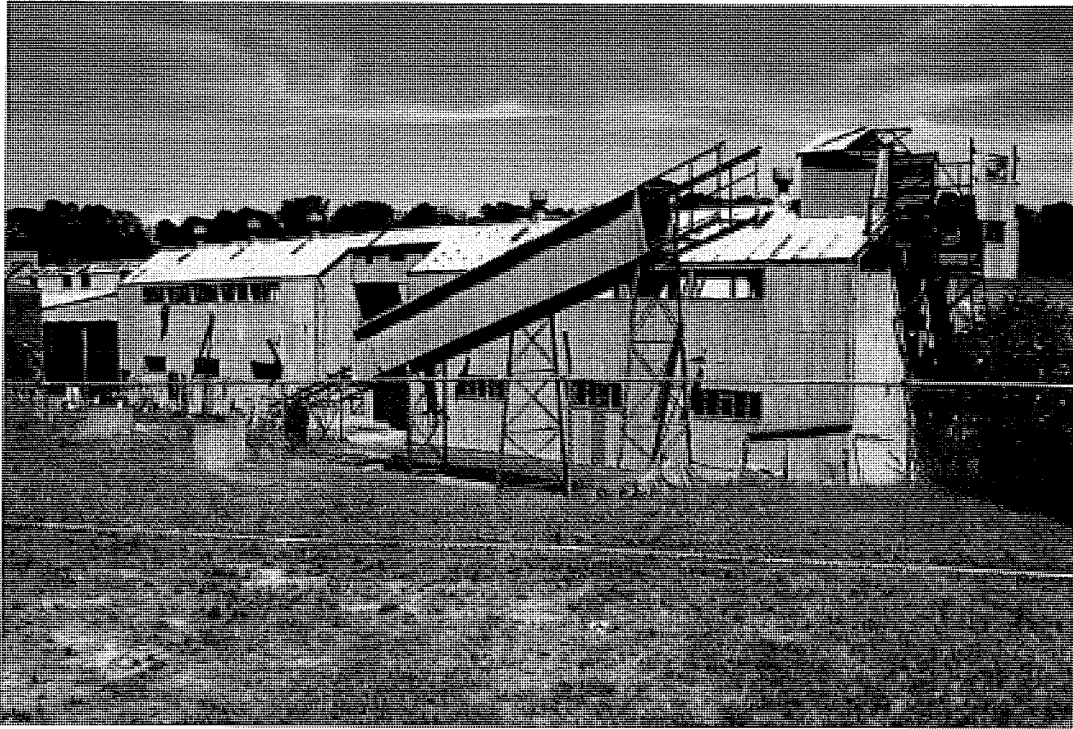


Figure 202 Another view westward into the site.



Figure 203 View southward between the kilns and their associated fan houses.

As noted earlier, the site is one where its historic and aesthetic qualities and the relationships between the different elements within the complex are experienced from within the site boundaries themselves and in moving around the site.

Rather than key views *per se*, generally it is the relationship between the different elements that is important (see, for example, the relationship between the brickpit (quarry) and the manufacturing buildings to the west and the relationship between the kilns and their associated fan houses and chimneys). There are interesting views toward the building complex from within the quarry including views from the north-east toward the corrugated iron clad process buildings along the eastern edge of the complex. In the latter case the relationship is evident in the view northward between the kilns and their associated fan houses and chimneys and this view preferably should be maintained.

Policy 18

An appreciation of the relationships between key elements of the complex should be maintained, including the link between the kilns and their fan houses and chimneys and the relationship between the brickmaking complex and the brickpit (quarry).

Policy 19

The view northward between the kilns and the fan houses and their associated chimneys should be maintained.

The visual links between the building complex and the quarry should be maintained.

8.6.11 *Adaptation*

The approach to adaptation on this site should be one that seeks to maintain an understanding of the history of the site and its operation while introducing feasible new uses that will support the heritage values of the place in the long term.

The reality is that the form, scale and configuration of a number of the buildings on the site is such that they offer limited scope for adaptation. This group would include the chimneys, the fan houses and a number of the smaller steel-clad process buildings, including those where remnant plant, platforms and other infrastructure survives internally and where the conservation policy is for retention of these elements.

The balance of buildings on the site, including the kilns and some of the larger process buildings, have good potential for the adaptation of internal spaces and in most cases potential also for external modifications to facilitate a new use. In considering this issue, however, it is recognised that in many cases, adaptation for a feasible use will necessarily alter the buildings in a relatively fundamental manner, and in some cases would be likely to result in an outcome that may challenge the assessed heritage value. For example, the White Pan Room (Large Crusher House, Building 19) is a building where adaptation for any new use other than as a basic shed would involve major physical change - enclosure of the partly open structure, introduction of new floor levels, vertical connections, services and the like - and would fundamentally alter the presentation and configuration of the structure. For many of the buildings on this site there would also be such substantial costs associated with adaptation such that reuse may not be feasible when considered on a building-by-building basis.

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While the CMP provides specific conservation policies and comments on the adaptation potential for each building of core and supporting significance (refer 8.7), it is preferable the consideration of adaptive reuse be undertaken as an integrated exercise for the site as a whole rather than on a building-by-building basis. The objective is that key aspects of the history and operation of the site are represented rather than focusing on any one particular building, particularly given their repetitive nature. This would allow for a more effective management of the balance between conservation and adaptive reuse. It also allows for a more liberal or interventionist approach to adaptation in some cases, on the basis that in other cases more of the significant fabric, external presentation and internal volumes are retained intact.

In doing so, the following overriding objectives should be considered, with reference to the options identified at 8.5:

Option 1 - whole of site conservation

- Retention of a representative area of the firing floor (including firing holes and any remnant equipment) to at least one kiln;
- Retention of a sense of the large internal volumes to one or more of the larger steel-clad process buildings east of the kilns;
- Retention of an understanding of the physical and functional connections between the process buildings to the east of the kilns; and
- Retention of a proportion of remnant process plant and/or related structure in the larger steel-clad process buildings east of the kilns.

Option 2 - partial site conservation

- Retention of a representative area of the firing floors to one or both of the Staffordshire or Hardy patent kilns (including firing holes and any remnant equipment); and
- Retention of representative areas of the kiln chambers to both kilns.

Refer also to the building-specific policies at 8.7 and 8.8.

Building connectivity

There is an established history of connections/links between buildings on this site, both below ground, at ground and elevated. While not an issue that is discussed on a building-by-building basis in the building-specific policies at (refer 8.7 and 8.8), in considering the related issues of adaptive use and site development there is an opportunity to continue these patterns of connectedness and multiple levels of activity in any future works.

Policy 20

Proposals for adaptive reuse should consider the complex as a whole and ensure that an appropriate balance is achieved between retention and conservation of fabric and delivery of a long term sustainable use. A key objective should be to ensure that the operation of the place as a brickworks can be readily understood in the retained and reused fabric without being reliant upon complex added interpretation.

8.6.12 *Site development and new works*

Key considerations

The area within the heritage curtilage has considerable potential for new development subject to that development being responsive to the cultural heritage values of the place.

In considering the location, scale, form and design of any new building/s and landscaping treatments, important considerations include the following:

- The overall legibility of the place as an industrial complex, including the planning, layout and spatial qualities of the site, and the relationship between key elements and building groupings (the quarry, process buildings, and kilns, represent the historic pattern/sequence of use of the site – zones for extracting, production, firing etc);
- Important views within the site (view northward between the kilns and the fan houses and their associated chimneys, views to and from the quarry); and
- The strong industrial aesthetic quality of the place;

The nature and location of site development contemplated will vary depending on the overall approach to the site. Refer to the discussion of Option 1 and Option 2 at 8.5.

In addition, all site development should have regard to the two heritage management zones identified at section 8.6.1 and as discussed below.

Primary heritage zone

In addition to the key considerations listed above, within the Primary Heritage Zone (refer 8.6.1), the following principles should apply to all new development:

The area of the quarry included within the Heritage Zone should generally be retained as an open landscape zone. New built form should be limited to incidental 'garden' structures other than along the north-south spine at the interface between the quarry and the plant area. In this area development could occur which reinforces this spine while maintaining some connection between the quarry and plant.

No new development should occur in the original brickyard space between the Staffordshire and Hardy Patent 1 kilns.

Any new buildings within the Primary Heritage Zone should be of a scale and nature that relates to the existing building forms on the site. They should be of a relatively massive in their scale and form, reflecting the existing industrial forms. The introduction of multiple domestic-scaled building forms (individual houses) should generally be avoided.

New development should respect and respond to the site planning principles of the existing complex including the orthogonal and gridded qualities of the layout and the pattern of access and circulation (refer to 8.6.14). To the west of the fan houses there is greater scope to explore a more diverse response.

As noted earlier, there is an established history of connections/links between buildings on this site, both below ground, at ground and elevated. In considering the related issues of adaptive use and site development there is an opportunity to continue these patterns of connectedness and multiple levels of activity in any future works. In this regard, subject to

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other objectives in this CMP, there may be scope for new buildings on the site to connect to retained buildings at one or more levels in order to facilitate access and circulation.

Buffer heritage zone

In addition to the key considerations listed above, within the Buffer Heritage Zone (refer 8.6.1), the following principles should apply to new development:

- Development within the eastern section of the Buffer Heritage Zone could adopt a wider range of different forms without an adverse impact on the heritage values of the Brickworks. This could include the use of the quarry floor for recreation and associated activities.
- The impact of new development in this eastern section on the views into the quarry and along the western edge of the Brickworks buildings complex should be considered.
- Development to the west, south and northern areas of the Buffer Heritage Zone should have regard to the identified setting of the brickworks.

Policy 21

All site development should be undertaken in accordance with the guidelines in this Conservation Management Plan.

8.6.13 *Site presentation*

In considering any new development or reuse of this complex, there is a need to consider the issue of the presentation of the place as a whole with reference to its valued industrial aesthetic character.

This is an issue that should be considered in the retention of elements that contribute to this character, to the design of any new buildings, to the adaptation of existing buildings and in any urban design/landscape planning undertaken for the site.

While there is a need to make the site safe, appropriately accessible and code-compliant (refer to 8.6.18), within these parameters as much as is possible of the industrial character of the place should be maintained, including not only the buildings and elements of core or supporting significance, but also the various remnants of plant and other features, including painted numbers/signs and other ephemeral elements that may not be of particular significance in their own right but that reference and support the character and presentation of the place. This also includes the infrastructure related to site drainage which is a distinctive feature of this site and presents as a series of grid lines around and between the main kilns.

In addition, any new landscaping / urban design treatment at the ground plane preferably should adopt an aesthetic that is in keeping with the history of the site and should not introduce an aesthetic that is at odds with that history (for example, an overly domestic treatment would not be appropriate in the vicinity of the main building complex or within the open spaces of the quarry). Any new treatment will require careful management of hard and soft landscaping elements so as to provide an appropriate setting for the retained buildings.

Policy 22

In considering any new development or reuse of this complex, there is a need to consider the issue of the presentation of the place as a whole with reference to its valued industrial aesthetic character.

8.6.14 Access and circulation

Documentary and photographic evidence suggests that the principal road access to the site historically has generally been from the south and south-west (though not necessarily exactly on the current alignment). There is also a strong tradition of connecting roadways along the west of the kilns and, in the post-1940 period, between the process buildings and the quarry (the latter reflecting the delivery of raw materials onto the site following the closure of the quarry).

The 1976 aerial photograph shows a more complex arrangement of roads within and around the site, including routes through and around the quarry reflecting the complex nature of truck movements in and out of the site in this later phase of operations.

Policy 23

The traditional principal approach to the Brickworks complex from the south should be maintained. Additional access points could be developed if required.

Within the site, the historic circulation pattern should be referenced in any future site planning, including the roadway along the western edge of the kilns and the space (roadway now removed) along the western edge of the quarry.

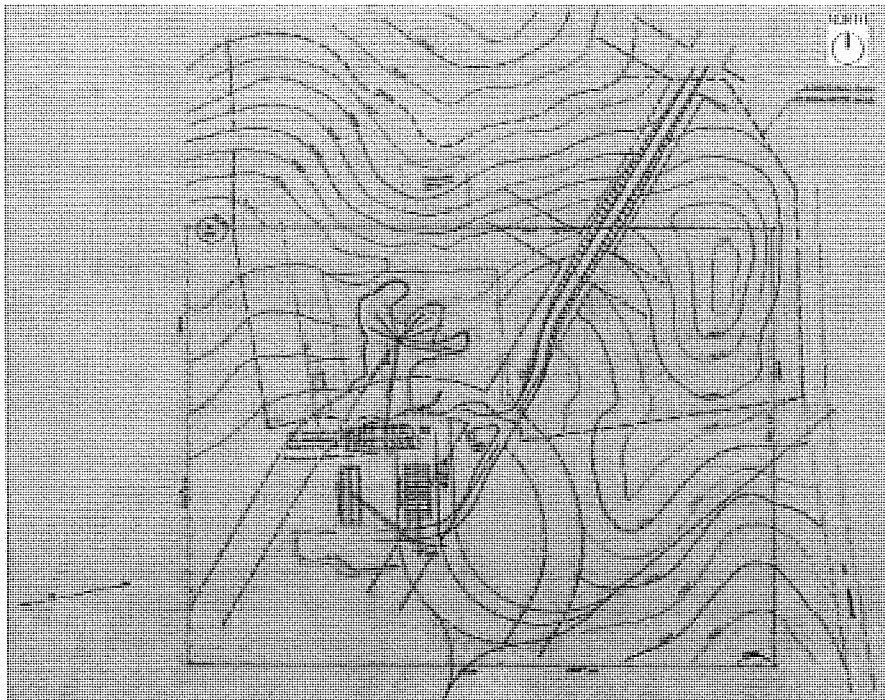


Figure 204 1926 site plan.
Source: National Archives of Australia

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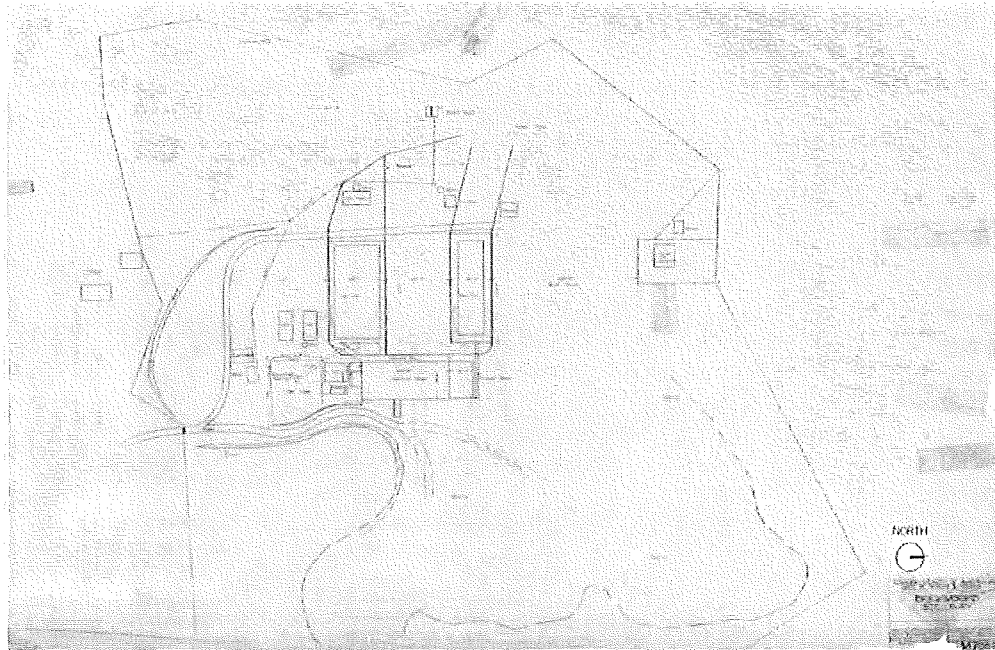


Figure 205 Site plan 1947.
Source: National Archives of Australia



Figure 206 Aerial view of the brickworks, 1950.
Source: ACT Planning and Land Authority.

3-18



Figure 207 Aerial view, 1976.
Source: ACT Heritage Library.

8.6.15 Site recording

In the situation where major change is proposed for the site, or where significant structures or elements are proposed for demolition or archaeological sites for disturbance or removal, it is recommended that a recording program be undertaken. This might include, but would not necessarily be restricted to, measured drawings and a black and white archival quality photographic record (the latter is still regarded as a sound and archivally reliable form of recording); a digital or video record may also be undertaken. The records should be lodged with an appropriate repository, for future research purposes. A copy should also be retained and used, where appropriate, in any future site interpretation.

It is also recommended that all works to the site, including maintenance, conservation or other works-related activities, be recorded, with records maintained centrally by the body responsible for the site.

It would also be desirable that an oral history project be undertaken for the site. Such a project should focus on the operation of the site as a brickworks and involve interviews with former employees. There are a number of reasons for undertaking such a project, including:

- expanding the scope of the existing archival record of the site;
- providing more specific information (including technical information) about the operation of the brickworks; and
- providing material that could potentially be used in an interpretation plan for the site (refer 8.6.16).

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Preferably, the oral history project should also include interviews with local residents about the history of the brickworks both pre- and post-closure and the relationship of the local community to the site. Given there was no scope in this CMP to undertake a full social values assessment, such a project could further inform the understanding of any social values which might attach to the site.

In addition to this, it would be desirable that more detailed documentary research be undertaken into the brickmaking processes and equipment used on this site. This would include more detailed research into the documentation held by the National Archives of Australia and elsewhere.

Policy 24

In the situation where major change is proposed for the site or significant structures or elements are proposed for demolition or archaeological sites for disturbance or removal, ensure an archival record is made prior to the works.

Maintain records of all works to the site, including maintenance, conservation or other works-related activities.

Undertake an oral history project for the site.

Undertake a more detailed research project into the processes and equipment used on this site.

8.6.16 Site interpretation

Any adaptive reuse or redevelopment proposal for the site should include the development and implementation of an interpretation plan for the site.

The form any interpretation plan will take will be dependant to a large degree on the nature of the new use or uses for the site and the level of public access that will be available to the site. Different interpretive devices are suited to different contexts.

Whatever its form, the interpretation plan should be developed on the basis it augments the physical evidence at the site and allows for a better understanding of the fabric and processes that occurred here historically.

It is important the plan work to improve the legibility of the site, including an understanding of the evolved nature of the buildings and complex as responsive to changes in brickmaking processes. It should also make reference to those features at the site that have been demolished, including site features which are evidenced through the archaeological record. The plan should also focus on the key historical themes associated with the site, the most important of which is its role in the early development of Canberra, as well, potentially as the experience of workers at the site (refer to the policy for site recording 8.6.8).

Policy 25

An interpretation plan should be developed for the site.

8.6.17 Risk Management

The most obvious and immediate risks to this site are considered to be those of fire and vandalism. To the extent that both can be related to unauthorised access into the site, these risks are to a degree interrelated. Unauthorised access also poses public safety risks; there are some limited areas of the building complex, including but not limited to the elevated walkways, which have structural and other issues of non-compliance and are not safe.

It is commented that the ongoing presence of the current tenant, Thor's Hammer, on the site, has a major positive benefit in terms of managing a number of these risks as it substantially reduces the risk of unauthorised access and activity within the main building complex. In the event the site is adapted and/or redeveloped, the pattern of access to the site will change and the security/vandalism risk should be reviewed at that time.

While the quarry is fenced off from the main building complex and approach road, access to this area is currently available via abutting residential properties. This access does not currently appear to pose major issues in terms of vandalism or other unwanted activity.

There are also site contamination (hazardous materials) issues which require management currently and into the future.

Threat	Probability	Preparation/Response
Vandalism	Moderate	Review site security for the building complex. Consider the provision of additional security measures to prevent access to individual buildings and structures.
Public safety	Moderate	Refer to recommendations above for reviewing site security, particularly those areas of the building complex that are not safe.
Fire	Always present	Refer to the recommendations of the 2007 and 2009 fire services and safety reports (by Steve Coomes and Ross Turton respectively) and review current arrangements against the recommendations in these reports. Fully compliant fire services will be required depending on the nature of any future use.

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Threat	Probability	Preparation/Response
Site contamination	High	Review the status of site against the findings and recommendations of the earlier environmental audits (Robson Laboratories, 2006) and implement these recommendations. Pending removal of hazardous materials secure areas against access as per the recommendations of these audits.

Policy 26

Identify risks and prepare an appropriate strategy.

8.6.18 *Statutory constraints**Statutory heritage framework*

The Canberra Brickworks is currently and will continue to be managed within a statutory framework established under the *Heritage Act* 2004 and the Planning and Development Act 2007 which acknowledges the heritage values of the place.

This is an appropriate level of statutory control having regard for the nature and level of significance of the place.

In terms of statutory processes, pursuant to Part 10 of the *Heritage Act* and s. 148 of the *Planning and Development Act*, for any registered (or nominated) place the ACT Planning and Land Authority (ACTPLA) is required to give a copy of any development proposal (in the merit or impact tract under that Act) to the Heritage Council. The Heritage Council provides advice (within 15 working days) to the ACTPLA about the effect of a development on the heritage significance of the place. This advice must be considered by ACTPLA in approving or refusing to approve a development application. The Heritage Council's advice to the ACTPLA is required to follow a prescribed format (s.60 of the *Heritage Act*). This advice must be considered by the ACTPLA in approving or refusing to approve a development application. There are appeal or review procedures to the Administrative Appeals Tribunal. These may be pursued by the Heritage Council (review of a decision by the ACTPLA to approve or refuse the application) or by the proponent or other interested party (review of a decision by the ACTPLA to refuse a development application or approve with conditions).

The *Heritage Act* also contains provisions enabling the Heritage Council to make Heritage Guidelines (refer Part 5 of the *Heritage Act*). Heritage Guidelines are a statutory instrument and made subject to a public consultation process under the Act. Pursuant to s.27 of the *Heritage Act*, a function under the Act that relates, directly or indirectly, to the conservation of a place or object must be exercised in accordance with any applicable heritage guidelines.

There are Heritage Guidelines prepared by the Heritage Council in place for the Canberra Brickworks. These include 'Specific Requirements' or guidelines addressing a range of activities and adaptation/development actions. These guidelines are directed at the implementation of a specified conservation policy developed by the Council, which reads as follows:

The identified heritage values and intrinsic features of the place shall be conserved whilst allowing for the integrated and sympathetic redevelopment of the place as a single entity, consistent with contemporary practices for the adaptive reuse of industrial and commercial heritage places. In conserving and developing the place its significant historical use as an industrial site for the production of bricks and clay products shall continue to be evident and accessible to the public.

Redevelopment of all or part of the place shall be in accordance with a Conservation and Management Plan endorsed by the ACT Heritage Council.

The Specific Requirements themselves are in a guideline format arranged under a series of headings:

- i. Landscape Setting
- ii. Built Structures – including alterations and additions
- iii. Industrial Equipment
- iv. Demolition

While not necessarily addressing all elements on the site individually, the guidelines are relatively detailed and address issues of conservation, demolition, alterations and additions to retained buildings, and site development, including prescribing setbacks from particular elements of any new landscaping or built elements.

The document makes reference to the need for a Conservation Management Plan endorsed by the Heritage Council to further direct the management of the site.

This Conservation Management Plan should be endorsed by the Heritage Council and the Heritage Guidelines revised both to make explicit reference to the CMP and to be in accordance with the CMP assessment (statement of significance) and conservation policies.

While there is much common ground between the Specific Requirements and the CMP, there are equally a number of key areas where there are inconsistencies and differences of approach. It would clearly be undesirable to have contradictory policy documents with recognised status under the *Heritage Act*.

Policy 27

The Canberra Brickworks should remain as a registered place in the ACT Heritage Register with its current extent of registration.

The Entry to the ACT Heritage Register should be reviewed and amended to make specific reference to the assessment and conservation policies contained in this Conservation Management Plan.

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The Conservation Management Plan should be endorsed by the ACT Heritage Council as the key document underpinning the future management, adaptation and development of the Canberra Brickworks site.

National Capital Plan

The National Capital Plan (NCP) is the strategic plan for Canberra and the Australian Capital Territory, established by the Australian Government under the Australian Capital Territory (Planning and Land Management) Act 1988. The overarching objective of the plan is to ensure that, 'Canberra and the Territory are planned and developed in accordance with their national significance'. The key aspects of national significance include:

- The pre-eminence of the role of Canberra and the Territory as the National Capital;
- Preservation and enhancement of the landscape features which give the National Capital its character and setting;
- Respect for the key elements of Walter Burley Griffin's formally adopted plan for Canberra;
- Creation, preservation and enhancement of fitting sites, approaches and backdrops for national institutions and ceremonies as well as National Capital Uses; and
- The development of a city which both respects environmental values and reflects national concerns with the sustainability of Australia's urban areas.

The NCP identifies 'designated land' within Canberra. This is, 'land that has the special characteristics of the National Capital'. The Canberra Brickworks is not designated land (Figure 209). However, land to the south, north and west (Sections 103, 113, 119 and 123) is designated, and forms part of the National Capital Open Space system: Sections 103 and 119 are designated land within the National Capital Area; sections 113 and 123 are identified as uncommitted. The Open Space system includes the inner hills that form the setting for the National Capital, and Lake Burley Griffin and its foreshore. The principal of visual separation between the main town centres within the National Capital is a key element of the Open Space system. The ridgeline to the south of the brickworks forms an effective barrier between Yarralumla and Woden to the south.

Specific recommendations with implications for the Canberra Brickworks in the NCP are:

- Any new road servicing the Canberra Brickworks be located off Dudley Street and not Cotter Road so as not to conflict with Dunrossil Drive as the formal entrance to the Governor General's residence.
- Any new residential areas should be contained to the north of the ridge line running from the Cotter Road / Dunrossil Drive intersection through to Denman Street so as to assist in maintaining visual separation between Central Canberra and Woden Valley.
- Existing amenity / inter-town visual separation planting be maintained within the blocks currently identified as 3/94, 1/123 and 1/113.

While of relevance to the planning of the abutting sites and surrounding area, these recommendations are not considered to have major implications for the management of the cultural heritage values of the Canberra Brickworks site.

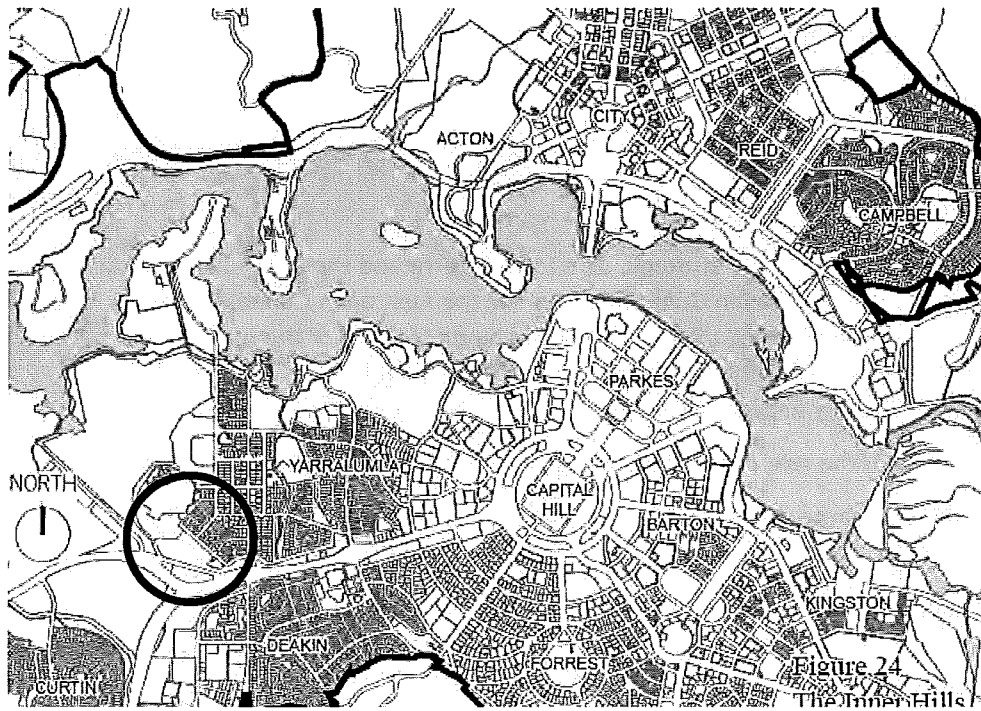


Figure 208 Plan of the National Capital showing the inner hills. The Brickworks is highlighted.

Source: National Capital Plan (consolidated, September 2009), p. 24.

CONSERVATION POLICY

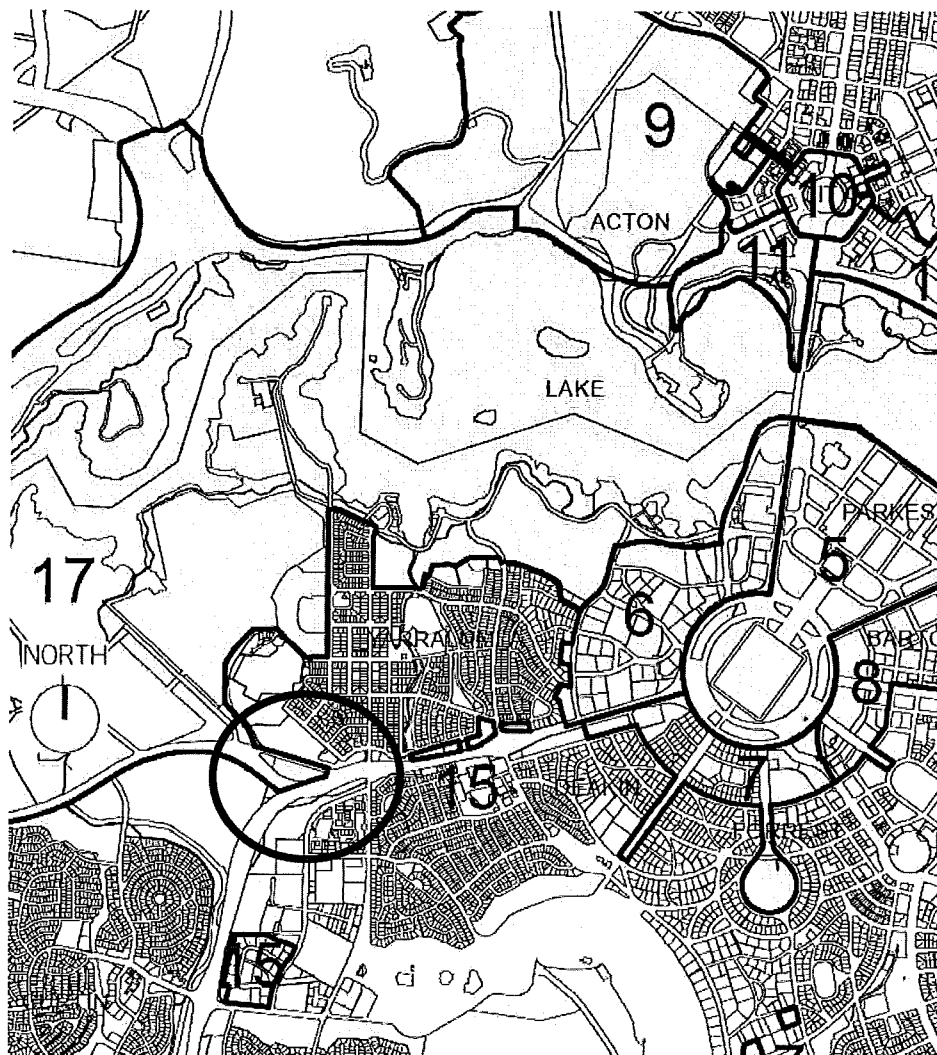


Figure 209 Designated land within the National Capital Plan. The Canberra Brickworks (highlighted) is excluded, but land to the south, north and west is included as part of the National Capital Open Space system.

Source: National Capital Plan (consolidated, September 2009), p. 28.

Territory Plan

The Territory Plan (TP), which is required to be consistent with the NCP, is the primary statutory planning document in the Australian Capital Territory and is established under the Planning and Development Act 2007. The overarching purpose of the TP is to manage development and land use change in a manner consistent with strategic directions set by the ACT Government, Legislative Assembly and the community.

The Canberra Brickworks and land immediately to the south and west (Blocks 7 and 20) are zoned Leisure and Accommodation.

Residential areas to the north (Lane-Poole Place) and east are designated RZ1 (suburban). The land between Dudley Street and the ridgeline to the north, and the section of Westbourne Woods to the west of the site is designated 'Restricted Access Recreation' (PRZ2) (Figure 210).

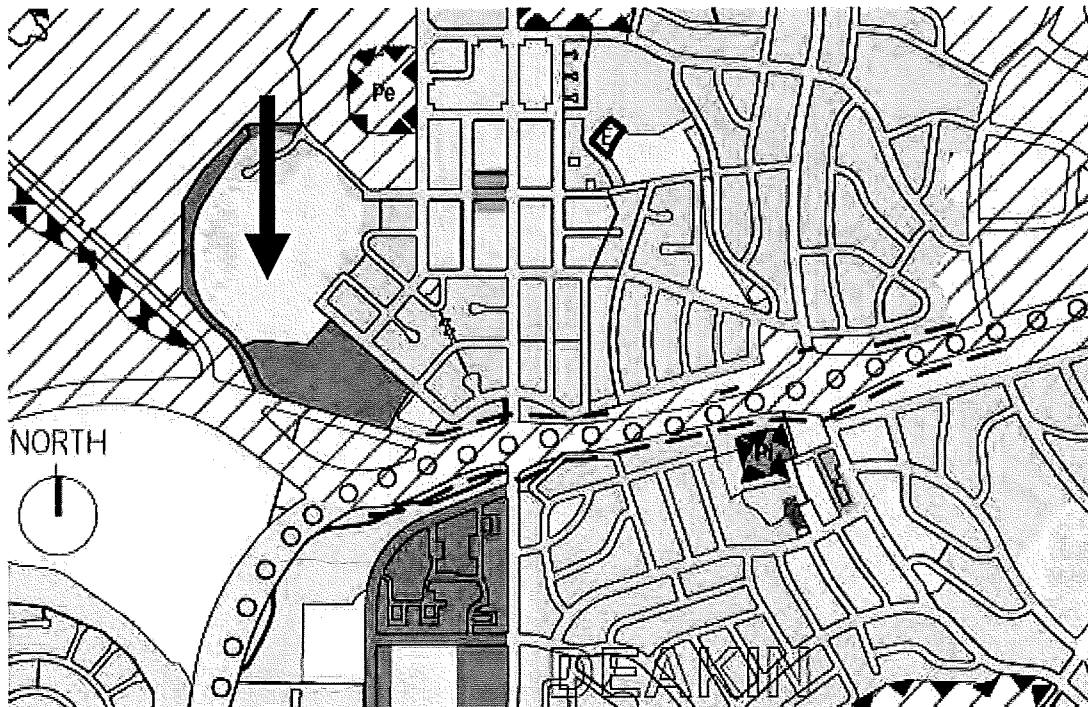


Figure 210 Land use plan (Territory Plan), with the Brickworks highlighted. Orange is Suburban (RZ1), dark green is Restricted Access Recreation (PRZ2) and blue is Leisure and Accommodation (CZ6).
Source: Territory Plan online.

The current zoning of the Brickworks (Leisure and Accommodation, CZ6) does not reflect the historic use of the site. While the zoning is wide-ranging in the uses that can be considered, it also does not necessarily capture all potential compatible uses. One or more alternative zonings could be considered to allow for an appropriate adaptive reuse and development on the site.

Consideration should be given to implementation of controls that would assist in the management of the Buffer Heritage Zone as identified in this Conservation Management Plan (refer 8.6.1)

Policy 28

Having regard for the Conservation Management Plan policies in relation to use, the Territory Plan could be amended to provide for consideration of a range of alternative uses at and within the registered site.

Consideration should be given to implementation of controls that would assist in the management of the Buffer Heritage Zone as identified in this Conservation Management Plan (refer 8.6.1)

CONSERVATION POLICY

Building Code of Australia

The Building Code of Australia (BCA) is produced and maintained by the Australian Building Codes Board (ABCB) on behalf of the Australian Government and state and territory governments. The BCA has been given the status of building regulations by all States and Territories.

The BCA is the definitive regulatory resource for building construction, providing a nationally accepted and uniform approach to technical requirements for the building industry. It contains technical provisions for the design and construction of buildings and other structures, covering such matters as structure, fire resistance, access and egress, environmental sustainability, services and equipment, and certain aspects of health and amenity.

In addition to the requirement for new work to comply with the BCA, in cases of existing buildings undergoing alterations and/or additions (including buildings with heritage controls), some discretion may be available with regard to upgrading the existing part of the building to meet the BCA, based on either fire safety or volume of work. This means that for an existing building where no work is being proposed, the building is not subject to the BCA and therefore, is not required by legislation to be upgraded whenever the BCA is amended. For an existing building undergoing alterations and/or additions, including buildings with heritage controls, the new work must comply with the BCA although the existing part of the building may be subject to discretion on the basis of a fire safety matter or where the development involves less than 50 per cent of the building. To ensure that this advice on BCA compliance and requirements remains up to date, property managers of the Canberra Brickworks should also make reference to the Australian Building Codes Board.

With specific reference to the heritage implications of achieving BCA compliance, the advice of a heritage practitioner should be sought.

Disability Discrimination Act 1992

The Disability Discrimination Act 1992 (DDA) makes it illegal to discriminate against a person on the basis of their disability. It is not specifically about buildings, however it has an effect on buildings in which the design and construction prevents access by people with a disability, as the owners of those buildings are deemed to be discriminating against people on the basis of a disability.

The DDA is philosophical in approach and:

- Is complaints based
- Has no construction standards
- Applies to actions of discrimination wherever they occur, and
- Can apply retrospectively to both new and existing buildings, wherever the discrimination occurs.

The 'access to buildings component' of the DDA is applied only to buildings that are available for the general public to enter and use, as employees, patrons, customers or the general public. Depending on the nature of future uses contemplated on this site, DDA compliance is likely to be an important issue.

8.6.19 *Adoption and Review*

Policy 29
It is recommended that the conservation policies in this report be endorsed by the Heritage Council, the ACT Property Group and the Land Development Agency, as the basis for the future planning and management of the Canberra Brickworks.

Where there is ambiguity or doubt as to the meaning of a policy, or concern with the practical implication or outcome of a policy’s implementation, then this should be clarified with the authors of the report.

Policy 30
The conservation policy should be subject to review, normally at not less than five yearly intervals. Should the circumstances affecting the site alter in any significant way, the policy should be reviewed at that time.

8.7 Specific policies for core elements

Introduction

The following policies are intended to be read and interpreted with reference also to the general conservation and adaptation policies in this document.

8.7.1 *Quarry (01)*

Conservation policy:

The Quarry should be retained as a landscape element that reflects in its form and presentation its origins as an excavated brickpit.

The identified geological features (rock outcrops) should be retained and protected.

Adaptation:

There would be scope for part of the quarry to be developed. The preferred approach would be one in which the western section of the quarry – closest to the brickworks buildings –and including all four of the identified geological sites of significance, was retained as an open landscape feature. While at least two small process-related buildings (clay storage shed and another, specific use unknown) are known to have been built on the levelled floor of this part of the quarry, the preference is for no new buildings to be constructed in this area.

Any new development should be confined to the area to the east and south (within the Heritage Buffer Zone), and should be of a siting, scale and form which will not compromise the presentation of the retained section of the quarry. Refer to the policy for New Works and Site Development (8.6.12).

CONSERVATION POLICY

8.7.2 *Power House (03)***Conservation policy:**

The Power House should be retained and conserved to the extent of the external fabric.

Consideration could be given to the reinstatement of infilled openings to the exterior.

The remnant equipment could be retained or removed as required.

Adaptation:

The building could be adapted internally for a new use.

8.7.3 *Staffordshire Kiln (04)***Conservation policy:**

The kiln should be retained and conserved.

Externally, while the building is highly modified and sections have been substantially rebuilt, the policy is that the fabric generally be retained.

Given the extent of modification that has occurred to the building over the life of the complex and the nature of these changes, there is no strong conservation imperative to reinstate missing or altered elements, including the 1915 single-storey verandah, for example (as was recommended in the 1986 Conservation Plan). Reconstruction or reinstatement of particular elements of the building to a particular phase when other elements and areas are extensively modified has the potential to distort an understanding of the evolved form of the building.

Internally, in order to demonstrate the nature and operation of the firing floors of the continuous kilns on the site, an area of the firing floor of either this kiln or one of the two Hardy patent kilns should be retained intact as a single volume and with all fabric intact including exposed roof trusses, floor with firing holes and examples of remnant control mechanisms. Refer also to the policies at 8.6.11).

It is highly desirable that the evolved nature of the kiln be interpreted so that the sequence of alterations is understood.

Adaptation:

Externally, there is scope for minor changes including new openings. Any new openings that are contemplated at first floor level (in the rebuilt external walls) preferably should be of a form and configuration that references the original.

Roof lights could be introduced though these should be limited in their scale and number.

At ground level, the entries to the kiln chambers generally should be retained intact (i.e. to their current modified form), though there is scope to enclose the chambers with doors recessed into the openings if required. The kiln chambers could be subdivided internally if required, though a representative group of chambers should remain open and un-subdivided.

The derelict remnant verandah structure could be removed and replaced with a new verandah if required. This could be a simple timber structure with corrugated iron roof

based on the original single-storey verandah. It should be clearly identifiable as a contemporary structure and preferably interpreted as such.

Internally, there is scope to adapt the first floor level for a new use or uses. Adaptation works could include internal subdivision and fitout works within the constraints of the conservation policy.

8.7.4 *Fan House for Staffordshire Kiln (05)*

Conservation policy:

The fan house should be retained and conserved including original window openings and joinery.

The internal configuration preferably should be retained as evidence of the original function of the building as the fan house to the Staffordshire kiln, including the lowered floor level and the tunnel connections with both the kiln itself and the associated chimney stack.

The remnant substantially dismantled plant could be retained for interpretive purposes or removed as required. If removed, it should be fully recorded.

Adaptation:

Externally, no new openings should be introduced.

The internal adaptation of the building is constrained by the recommendation that its internal configuration be retained.

There is little or no scope for adaptation of this building.

8.7.5 *Chimney stack for Staffordshire Kiln (06)*

Conservation policy:

The chimney stack and attached kiln should be retained and conserved.

Adaptation:

There is no scope to adapt the chimney or attached kiln.

8.7.6 *Offices (07)*

Conservation policy:

The office building preferably should be retained (refer to 8.5) and conserved and the feasibility of removing the additions and reinstating the original form of the building investigated.

Adaptation:

The building could be adapted internally.

CONSERVATION POLICY

8.7.7 *Hardy patent kiln I (08)***Conservation policy:**

The Hardy patent kiln should be retained and conserved.

Externally, while the building is highly modified and sections have been substantially rebuilt, the policy is that the fabric generally be retained.

As for the Staffordshire kiln (Building 4, given the extent of modification that has occurred to the building and the nature of these changes, there is no strong conservation imperative to reinstate/reconstruct missing or altered elements.

Internally, in order to demonstrate the nature and operation of the firing floors of the continuous kilns on the site, an area of the firing floor either the Staffordshire kiln or one of the two Hardy patent kilns should be retained intact as a single volume and with all fabric intact including exposed roof trusses, floor with firing holes and examples of remnant control mechanisms.

It is highly desirable that the evolved nature of the kiln be interpreted so that the sequence of alterations is understood.

Adaptation:

Externally there is scope for the introduction of new openings at first floor level and in the roof if required.

At ground level, the entries to the kiln chambers generally should be retained in their current modified form, though there is scope to introduce doors recessed into the openings if required. Where openings have been infilled with brickwork this could be removed if required. The current verandah is not original and could be replaced if required, preferably with a simple steel or timber posted structure.

Internally, the kiln chambers could be subdivided internally if required and the firing floor adapted (within the constraints of the conservation policy).

8.7.8 *Hardy patent kiln fan houses (09)***Conservation policy:**

The Hardy patent kiln fan houses should be retained and conserved including the internal configuration and connecting ducts.

Adaptation:

There is no scope for adaptation of these buildings.

8.7.9 *Chimney Stack for Hardy patent kiln I (10)***Conservation policy:**

The chimney stack should be retained and conserved.

Adaptation:

There is no scope to adapt the chimney.

8.7.10 *Chimney Stack for Hardy patent kiln II (13)*

Conservation policy:

The chimney stack should be retained and conserved.

Adaptation:

There is no scope to adapt the chimney.

8.8 Specific policies for supporting elements

8.8.1 *Amenities block (11)*

Conservation policy:

While retention is preferred (refer to 8.5) as part of the larger group of 1950s buildings reflecting the operation of the complex in the post-WWII period, the amenities block is considered a lesser element as an ancillary building unrelated to process.

Adaptation:

The building could be adapted internally.

8.8.2 *Hardy patent kiln II (12)*

Conservation policy:

The Hardy patent kiln II preferably should be retained (refer to 8.5) and conserved to the extent of its external form and fabric including the first floor steel-framed windows.

Internally, in order to demonstrate the nature and operation of the firing floors of the continuous kilns on the site, an area of the firing floor either the Staffordshire kiln or one of the two Hardy patent kilns should be retained intact as a single volume and with all fabric intact including exposed roof trusses, floor with firing holes and examples of remnant control mechanisms.

Other than for the modifications to the wickets to allow fork lift access, and the alterations at the west end, this kiln appears to be relatively intact as built in 1953 and it would be desirable no significant changes be made to the exterior.

Adaptation:

At ground level, the entries to the kiln chambers generally should be retained in their current modified form, though there is scope to introduce doors recessed into the openings if required. Where openings have been infilled with brickwork, this could be removed if required.

The building could be adapted internally, including subdivision of the kiln chambers and first floor.

CONSERVATION POLICY

8.8.3 *Machine Bay I for Staffordshire Kiln and Downdraught Kilns (14)***Conservation policy:**

Machine Bay I preferably should be retained and conserved (refer 8.5) including the skillion form connection to the Staffordshire and Downdraught kilns.

The conveyors, hoppers, walkways etc at the upper level preferably should be retained in situ.

Adaptation:

Externally, there is scope for modifications to be made while still retaining the overall form and presentation of the building.

It would be desirable to retain a sense of the internal volumes in this building and the other related structures. Refer to the policy objectives at 8.6.11.

8.8.4 *Machine Bay II for Hardy patent kiln I (15)***Conservation policy:**

Machine Bay II preferably should be retained and conserved (refer 8.5) including the skillion form connection to the Hardy patent kiln and the elevated conveyor 'bridge' that connects this building to Machine Bay III.

The conveyors, hoppers, walkways etc at the upper level preferably should be retained in situ.

Adaptation:

Externally, there is scope for modifications to be made while still retaining the overall form and presentation of the building.

The building could be adapted internally. It would be desirable to retain a sense of the internal volumes in this building and the other related structures. Refer to the policy objectives at 8.6.11.

8.8.5 *Machine Bay III for Hardy patent Kiln II (16)***Conservation policy:**

Machine Bay III preferably should be retained and conserved (refer 8.5) including the skillion form connection to the Hardy patent kiln and the elevated conveyor 'bridge' that connects this building to Machine Bay II.

The conveyors, hoppers, walkways etc at the upper level preferably should be retained in situ.

Adaptation:

Externally, there is scope for modifications to be made while still retaining the overall form and presentation of the building.

The building could be adapted internally.

It would be desirable to retain a sense of the internal volumes in this building and the other related structures. Refer to the policy objectives at 8.6.11.

8.8.6 *Workshop (17)*

Conservation Policy:

The Workshop preferably should be retained and conserved (refer 8.5).

The conveyor that connects this building to the others in this sequence preferably should be retained in situ. There is no requirement to retain the gantry crane or other remnant equipment or internal structure.

Adaptation:

The building could be adapted internally. External modifications could be made if required.

8.8.7 *Small Crusher House (Crusher House I) (18)*

Conservation Policy:

The Small Crusher House preferably should be retained and conserved (refer 8.5).

The remnant platforms and hopper preferably should be retained.

Adaptation:

There is no scope to adapt this building.

8.8.8 *White Pan Room (Large Crusher House II) (19)*

Conservation Policy:

The White Pan Room preferably should be retained and conserved (refer 8.5), though it is recognised in its current condition, this objective may be difficult to achieve.

While not essential, consideration should be given to the retention of the remnant platforms and hopper.

Adaptation:

There is limited scope to adapt this building other than with extensive intervention.

8.8.9 *Primary Crusher House (Crusher House III) (20)*

Conservation Policy:

The Primary Crusher House preferably should be retained and conserved (refer 8.5).

The remnant machinery and conveyor preferably should be retained.

Adaptation:

There is limited scope to adapt this building.

CONSERVATION POLICY

8.8.10 *Elevator/Conveyor (21)***Conservation Policy:**

The Elevator/Conveyor preferably should be retained and conserved (refer 8.5).

Adaptation:

There is no scope to adapt this building.

8.8.11 *Downdraught kilns and associated enclosure (22)***Conservation Policy:**

The Downdraught kilns preferably should be retained and conserved (refer 8.5). While thought to be broadly contemporary with the kilns, the enclosing shed roof structure could be retained or demolished as required.

Adaptation:

There is scope to adapt the Downdraught kilns, including internal subdivision.

The enclosing shed roof structure could be modified as required.

8.8.12 *Downdraught kiln control room***Conservation Policy:**

The control room preferably should be retained and conserved (refer 8.5).

Adaptation:

There is no scope to adapt this building.

8.8.13 *Chimney Stack for Downdraught kilns (24)***Conservation Policy:**

The chimney stack preferably should be retained and conserved (refer 8.5).

Adaptation:

There is no scope to adapt this building.

8.9 Incidental elements

Incidental elements could be retained or demolished as required.

CANBERRA BRICKWORKS

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APPENDIX A ACT HERITAGE REGISTER ENTRY & RNE CITATIONS



ACT Heritage Council

Entry to the ACT Heritage Register

Heritage Act 2004

20068. Yarralumla Brickworks

Section 102 Block 1

YARRALUMLA

This document has been prepared by the ACT Heritage Council.

This entry which was previously part of the old heritage places or the old heritage objects registers (as defined in the *Heritage Act 2004*), as the case may be, is taken to be registered under the *Heritage Act 2004*.

Conservation Requirements (including Specific Requirements), as defined under the *Heritage Act 2004*, that are contained within this document are taken to be Heritage Guidelines applying to this place or object, as the case may be.

Information restricted under *the old heritage places register or old heritage objects register* is restricted under the *Heritage Act 2004*.

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ACT Government



environment ACT

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 Website : www.cmd.act.gov.au
 E-mail: EnvironmentACT@act.gov.au

68. Yarralumla Brickworks, Yarralumla [V118]¹

Location

District of Canberra Central, Division of Yarralumla, Section 102 Block 1 as identified in Figure 68 and indicated on the Territory Plan Map by the Heritage Places Register Overlay H68.

Features Intrinsic To The Heritage Significance Of The Place

The place comprises the elements listed in Schedule 1 (rated as possessing exceptional significance) and Schedule 2 (rated as possessing considerable significance), as identified in Figure 68a.

Schedule 1 Elements Of Exceptional Significance

- 1) Kiln - Staffordshire (1915)
- 2) Fan House for Staffordshire Kiln (1915)
- 3) Kiln - Hardy-Patent (1927)
- 4) Fan House for Hardy Patent Kiln (1953)
- 5) Kiln - Hardy-Patent (1953)
- 6) Kilns - Downdraft a, b, c (1963)
- 7) Chimney Stacks for Staffordshire Kiln (1915)
- 8) Chimney Stack for Hardy Patent Kiln (1927)
- 9) Chimney Stack for Hardy Patent Kiln (1953)
- 10) Chimney Stack for Downdraft Kiln (1963)
- 11) Quarry
- 12) Geological features A, B, C, D

Schedule 2 Elements Of Moderate Significance

- 13) Office (1916)
- 14) Power House (1915)
- 15) Machine Bay for Staffordshire and Downdraft Kilns (1955)
- 16) Machine Bay for Hardy-Patent (1955)
- 17) Machine Bay for Hardy-Patent (1955)
- 18) Workshop (1955)
- 19) Large Crusher House (1955)
- 20) Primary Crusher House (1955)
- 21) Small Crusher House
- 22) Elevator Conveyor (1955)
- 23) Remains of the Brickworks Accommodation Village

Statement Of Significance

Operational from 1913 to 1976, the Yarralumla Brickworks is of historical value as the first industrial manufacturing facility within the ACT, and for its integral role in providing the base material used in the construction of the early buildings in the National Capital.

The Yarralumla Brickworks is a relatively intact representative example of large urban brickworks from the early 20th Century, a type that is becoming increasingly rare nationally and internationally. The Brickworks comprise a cultural landscape where the remaining buildings, structures, equipment and landscape features have the ability to demonstrate the evolution of a range of industrial processes associated with brick and clay production-over a 60 year period.

The Yarralumla Brickworks is of considerable technical value from the presence in the one location of a number of different kiln types: Staffordshire (1915), Hardy-Patent (1927) and Downdraft (1953) kilns, which demonstrate an unusually wide range of firing processes. The Staffordshire kiln is especially significant as the only surviving example of this kiln type in Australia. The Staffordshire kiln variation to the Hoffman design of kiln allowed bricks, tiles and pipes to be fired in cycles and utilises an unusual fan-forced draft system to aid firing.

¹ [V118: Added to Heritage Places Register Number 68 10/05/2001 (Variation Number 118)]

The largest chimney stack (element 9) is of aesthetic and social value as a prominent landmark in the central urban area, visible from the Lake Burley Griffin foreshores, New Parliament House and mountain lookouts around the City. Additional aesthetic value is associated with the composition and sculptural forms of the built elements, specifically the kilns, stacks and larger elements of equipment.

The Yarralumla Brickworks is one of a broad thematic group of remnant industrial and engineering heritage places that were built to facilitate the initial development of Canberra including the Cotter Dam and Pumping Station and the Kingston Power House.

The brickpits have historical value as a primary source of clay and are also of considerable geological value as the type locality for the 'Yarralumla Formation', dating from the Silurian Period 425 million years ago. The scheduled stratigraphic rock units constitute the reference section against which all other outcrops within the Formation are compared. It is the only fossil marine unit within the extensive volcanic marker horizons of South Canberra. Sites A and D show excellent examples of an anticline in calcareous siltstone, Site B shows a typical tuffaceous mudstone and siltstone of the Yarralumla Formation and Site C shows abundant fossils of mainly graptolites, trilobites, coral and a simple crinoid preserved in a bedding plane.

Specific Requirements

In accordance with s54 (1) of the *Land (Planning and Environment) Act 1991* the following requirements are identified as essential to the conservation of the heritage significance of the place. These requirements are prepared to implement the following conservation policy for the place:

The identified heritage values and intrinsic features of the place shall be conserved whilst allowing for the integrated and sympathetic redevelopment of the place as a single entity, consistent with contemporary practices for the adaptive reuse of industrial and commercial heritage places. In conserving and developing the place, its significant historical use as an industrial site for the production of bricks and clay products shall continue to be evident and accessible to the public.

Redevelopment of all or part of the place shall be in accordance with a Conservation and Management Plan endorsed by the ACT Heritage Council.

i) Landscape Setting

- a) The quarry landform (11) should be retained in a manner whereby it is clearly evident to be a man made excavation, associated with the industrial use of the site. Subject to the recommendations of the Conservation and Management Plan, revegetation, enhanced hard and soft landscaping and low-medium height buildings with a high proportion of landscape open space may be permitted in the vicinity of the quarry, including on land overlooking the quarry and within the quarry excavation. The shape of the quarry may be altered in a minor manner, however access points into and out of the quarry area should utilise existing openings and gradients within the landform. The historical linkage between the quarry and kiln areas shall be expressed in any new development.
- b) The geological features (12 A-D) shall be integrated within any site landscaping treatment. Disturbance of the immediate surface shall be limited to works that protect, stabilise or enhance the interpretation of the geological values. The immediate environs of the geological features to a distance of approximately 10 metres shall be retained as landscape open space.
- c) To reflect historical usage patterns at the site and protect the setting of significant elements, the immediate environs of the kilns (1, 3, 5, 6) as identified below shall be retained as landscape open space, clear of any major structures. Minor structures and landscaping treatments that retain the kilns, stacks and fan houses as the dominant visual elements to the space may be permitted within:
 - The open concourse running north-south from the Hardy Patent Kiln (Element 5) to the Downdraft Kilns (6a-c), between the kilns and fan houses (2, 4),
 - The spaces between the kilns: (5-3, 3-1, 1-6)
 - The immediate environs of the chimney stacks (7, 8, 9, 10), fan houses (2, 4) and primary crusher house and elevator conveyor (20, 22) to a distance of generally 10m.
- d) New hard and soft landscaping treatment should generally express the historical spatial relationships and movement patterns of brick making operations about the site.

- ii) **Built Structures - including alterations and additions**
- a) The existing large chimney stack (9) shall be conserved and maintained in its current form as a prominent urban landmark.
 - b) The external form, including the arrangement of openings and detailing that reflects the industrial use of the built elements in Schedule 1 (1-10) and the Primary Crusher House (Schedule 2: 20) shall be retained.
 - c) Minor external alterations and additions and major internal alterations to the built elements in Schedule 1 may be permitted to suit a new use where the proposed works will not adversely affect the heritage significance of the elements or the place as a whole.
 - d) Alterations and additions to the original built fabric of elements in Schedule 1, including alterations to external finishes, shall complement the historical industrial use and architectural style of the place.
 - e) Subject to the recommendations of the Conservation and Management Plan, the elements in Schedule 2 may be conserved to interpret the historical use of the place or adapted to suit a new use for the place.
 - f) Elements in Schedule 2 that no longer include substantial evidence to describe industrial processes (15, 16, 17, 18, 19 and 21) may be replaced with new development that is generally consistent with the scale, form, external materials and industrial character of the place. The Office, the Powerhouse, Primary Crusher House and the Elevator Conveyor (13, 14, 20 and 22) may be relocated elsewhere within the place, subject to the relocation process being fully documented and full reconstruction of the buildings taking place within a specified period. Development may occur on the site of the remains of the Brickworks Accommodation Village (23), subject to detailed recording and suitable interpretation of the historical significance of the site.
 - g) Construction of new buildings or elements in the place may be permitted if any new building(s) or element(s) do not significantly diminish the heritage value of the place. The scale, form, detailing and external materials of any new buildings or structures shall be consistent with the architectural style and industrial character of the built elements in Schedule 1.
- iii) **Industrial Equipment**
- a) Major equipment and machinery associated with the historical industrial use of the place shall be retained and conserved in situ. Minor equipment should be retained and conserved but may be relocated to a new location within the site for interpretative purposes and/or its own protection.
 - b) The Primary Crusher House (20), including the integral equipment and machinery, and the Elevator Conveyor (22) shall be conserved for their ability to demonstrate and interpret industrial processes and secondary aesthetic values.
- iv) **Demolition**
- a) Subject to (iv)(b) (c) and (d) demolition of elements listed in Schedule 1 and 2 shall not be permitted, other than in exceptional circumstances, including circumstances in which the building or structure is structurally unsound and beyond economic repair or where there are significant public health and safety reasons to warrant demolition. Demolition shall not be permitted unless it can be demonstrated that there is no prudent and feasible alternative.
 - b) The demolition of the original internal fabric of buildings within Schedule 1 shall only be permitted in the context of sympathetic alteration and additions, as identified within the Conservation and Management Plan.
 - c) Elements in Schedule 2 may be demolished only to allow for new development in accordance with the Conservation and Management Plan and specific requirements (ii) (e) and (f).
 - d) Comprehensive recording of a building or structure shall be undertaken prior to any demolition or removal of fabric.

Figure 68: Yarralumla Brickworks, Yarralumla: Location

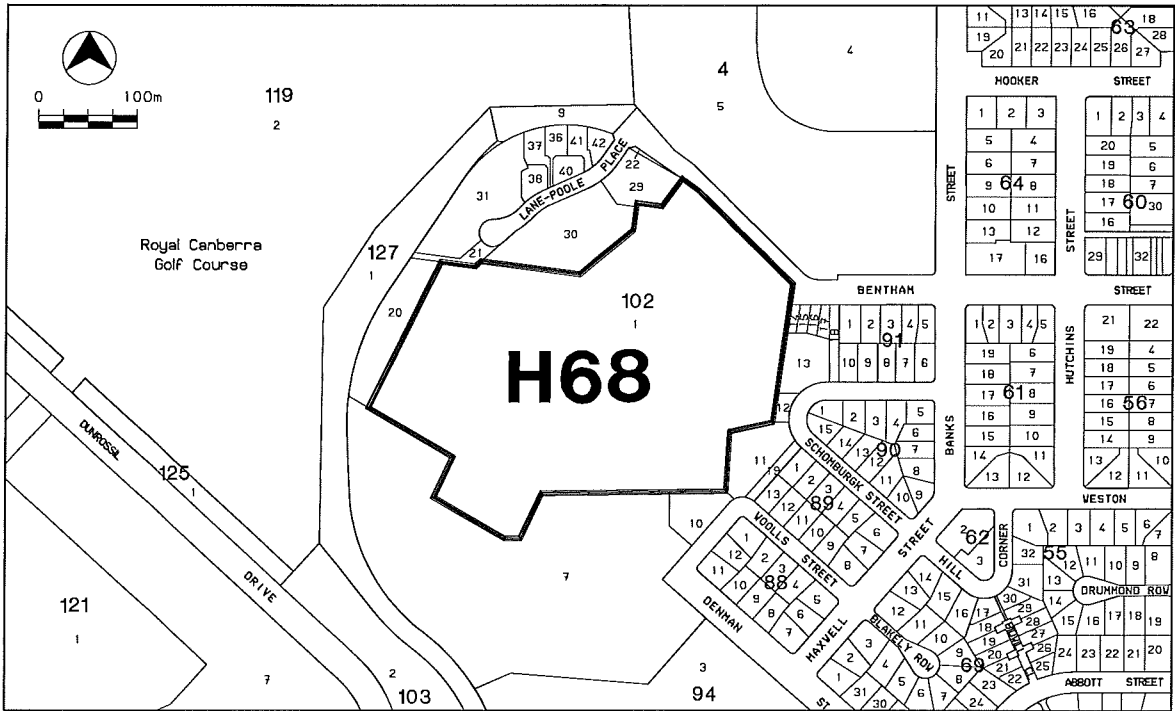
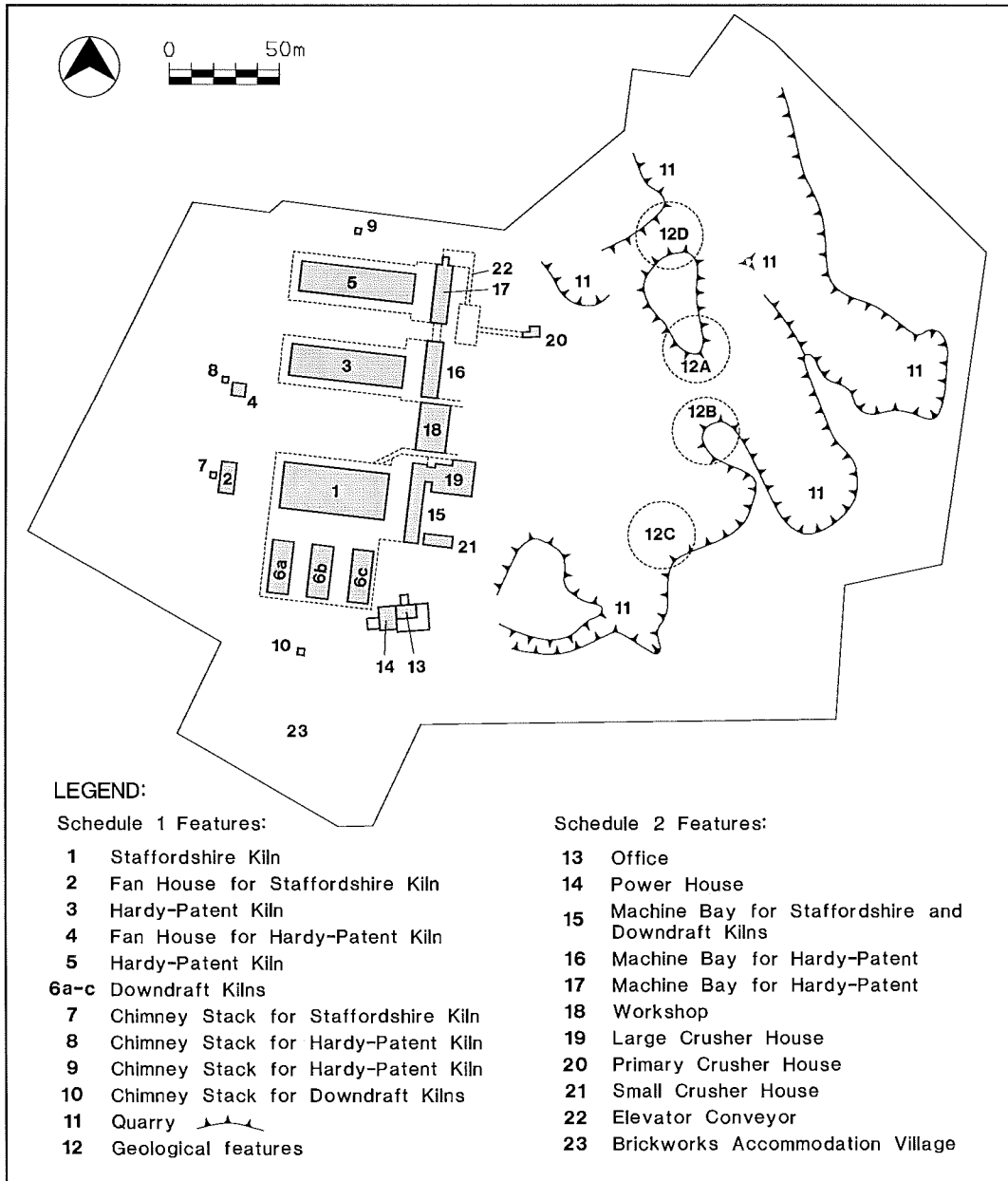


Figure 68a: Yarralumla Brickworks, Yarralumla: Significant Features



Place Details

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Yarralumla Brickworks (extended area), Denman St, Yarralumla, ACT, Australia

Photographs:	None
List:	Register of the National Estate
Class:	Historic
Legal Status:	<u>Registered</u> (26/10/1999)
Place ID:	101439
Place File No:	8/01/000/0039

Statement of Significance:

Yarralumla Brickworks is significant as one of three initial industrial and service complexes built to facilitate Canberra's construction, the Brickworks provides a tangible evidence of the city's construction. The Kingston Powerhouse and the Cotter Dam and pumping station were the other initial complexes and are entered in the Register of the National Estate. Their values are described in RR013364 and RR013623 respectively. (Criterion A.4) (Themes 3.10 Altering the environment for economic development, 4.6 Remembering significant phases in the development of towns and suburbs, 5.2 Organising workers and work places)

The Yarralumla Brickworks are significant as one of the few remaining examples of a large urban brickworks, which are becoming increasingly rare both nationally and internationally. The Brickworks are significant for the presence in the one location of a number of different kiln types: Staffordshire, Hardy-Patent and Downdraft kilns. Consequently presenting a wide range of firing processes, which are readily comprehensible. The kilns, together with the ancillary brickworks buildings, are important in demonstrating the changing processes of brick and clay production. The Staffordshire kiln was the first of its kind to be used in Australia and is believed to be the only surviving example of this kiln type in Australia. (Criterion B.2)

Operating as a brickworks from 1913 to 1976, Yarralumla Brickworks is significant as a representative example of a large urban brickworks. (Criterion D.2)

The industrial site in its woodland setting, and particularly the brick chimney (S3), Kilns, and quarry, has considerable aesthetic qualities. (Criterion E.1)

The geological features at the brickworks site are important as expressions of the type locality of the Yarralumla Formation from the Silurian Period of 425 million years ago. Sites A and D show excellent examples of anticline in calcareous siltstone, Site B shows a typical tuffaceous mudstone and siltstone of the Yarralumla Formation and Site C shows abundant fossils of mainly graptolites, trilobites and crinoids preserved in a bedding plane. (Criterion C.1) (Themes 1.1 Tracing climatic and topographical change, 1.2 Tracing the emergence of and development of Australian plants and animals).

Official Values: Not Available

Description:

The features intrinsic to the heritage significance of the place are as follows (the numbering is consistent with the Old Canberra Brickworks Conservation Plan and the ACT Heritage Council citation):-
Kiln - Staffordshire (K1), Fan House for Staffordshire Kiln (F1), Office (O), Power House (PH), Quarry (Q), Geological Feature A, Geological Feature B, Geological Feature C, Geological Feature D, Fan House for Hardy Patent Kiln (F2), Chimney Stacks (S1-4), Kiln - Hardy-Patent (K2), Kiln - Hardy-Patent (K3), Kilns

- Downdraft (K4), Machine Bay for Staffordshire and Downdraft Kilns (M1), Machine Bay for Hardy-Patent (M2), Machine Bay for Hardy-Patent (M3), Workshop (W), Large Crusher House (C2), Primary Crusher House (C3), Small Crusher House (C1) and the Elevator Conveyor (E).

The brickworks consists of a range of buildings, machinery and equipment associated with the production of bricks. Archaeological remains would also exist at the site. There are other buildings on the site, which relate to subsequent uses of the place. To the east of the buildings are the remnants of the clay pits or quarry. There is a small lake at the northern end of the pits.

The Staffordshire Kiln (K1) is a two storey structure originally built in 1914/15 with a brick base and upper walls and a galvanised iron roof. It was one of the first of this type to be built in Australia. In c1924 it was surrounded by an upper verandah for drying tiles. The Staffordshire kiln type is characterised by a series of separate side by side chambers which enabled a single chamber to give special treatment to its contents. Prior to this, separate kilns had been needed. Other advantages to this kiln were complete quality of control over temperatures, a cost reducing drying technique and lower fuel consumption.

The Staffordshire Kiln fan house (F1) was constructed in conjunction with the Staffordshire Kiln approximately 20 metres to the west. The use of fans enabled kilns to be fired independently of atmospheric conditions, which had previously restricted firing times. The building is a single storey brick Federation style.

The Hardy Patent Kiln (K2), also known as a modified Hoffman Kiln type, is a two storey building dating from 1927. The lower storey is constructed of brick and the upper storey of corrugated iron. Due to the collapse of some major walls, the kiln was almost totally rebuilt in 1955 and extended from 18 to 20 chambers with the openings enlarged to enable access for forklift vehicles.

The Fan House (F2) is comprised of two identical small scale galvanised iron sheds constructed 25 years apart to house fan equipment for the Hardy Patent Kiln. They are located approximately 20 metres west of the kiln. The other Hardy Patent Kiln (K3) constructed in 1953 is almost identical, but retains its original second storey superstructure.

In the early 1960s three down draft (dome) kilns (K4) were constructed of brick with large fire brick lined metal doors with a number of penetrations along the sides of the kilns enabling the kilns to be fired and checked.

There are four chimney stacks on the site. The first (S1) is constructed of red bricks and was built adjacent to the Staffordshire kiln in 1915. Another chimney stack (S2) was built in conjunction with the fan house in 1927 to service the Hardy-Patent kiln. In about 1953 a further stack (S3) was built. Its height of 55 metres was to allow for the use of natural drafts to exhaust heat and fumes from the kiln (K3). This was unsuccessful, as drafts to the chimney were blocked by the surrounding terrain and a fan house had to be installed twelve months later. The fourth stack is associated with the three down draft kilns and was built in 1925 for the two earlier down-draft kilns. About 15 metres tall, it has a small steel door on the southern wall and a large opening in the eastern wall approximately 2.5 metres above ground level.

As part of the upgrading of the brickworks in 1955 and to meet the post World War Two production increases, three machine bays were built. One was a galvanised iron clad steel and concrete structure built on the site of the 1915 workshop and tile plant. Two others were built to service the Hardy-Patent kilns, both two storey steel framed structures clad in corrugated iron with concrete slab floors. As part of the upgrading a workshop (W) for general repairs and maintenance of machinery was also built. It is steel frame construction with metal cladding on the walls and roof. A crusher house (C1) of steel framed construction with corrugated iron cladding was also built as part of the upgrade. A second crusher room (C2) housing a crusher on the site of the original crusher is located to the east of the first Machine Bay. The primary crusher house (C3) is a small building located on the site of the original crusher to the east of Machine Bay 1. Material was crushed here in the first instance and then conveyed to the other crushers for recrushing. The building was a steel frame construction with metal cladding and a large concrete retaining wall on the eastern side.

In 1955, a conveyer elevator (E) was constructed. Shale was conveyed to the pan room where it was ground and screened then loaded onto the conveyor/elevator, which carried the raw material to a distribution hopper. The distribution hopper is an enclosed elevator system with walkway constructed with steel frame and supports.

The original galvanised office for the brickworks was removed for uses associated with the original machine shed. The construction of the present office building (O) is believed to date from 1916, the same date as the powerhouse (PH). The office is constructed as a small brick and tile gable ended building. Over the years, extensions have been added mostly with flat roofs to meet the needs of the expanding brickworks.

Prior to the commissioning of the Kingston Powerhouse in 1916, the brickworks was powered by a steam engine housed in a temporary detached corrugated iron building. The 1916 permanent building has an exposed concrete floor, exposed brick walls and high corrugated metal ceiling. The western wall had two screened openings. Entry to the substation is through two pairs of doors at either end of the building.

Earthworks outside the brickworks delineate the route of the Brickworks railway, which once connected the brickworks to the Kingston railway yards, the Provisional Parliament House and Civic. The track exits the brickworks at the southern boundary and is identified by the ditch and bank formation. As the track turns eastwards it follows a manmade bank.

Land located in the far west of the site is reported to have been the site of an early quarry, and has subsequently been used for waste from the brickworks operation.

The quarry lies to the east of the brickworks building from which shale was extracted for the brickmaking process. A 2ft (610mm) narrow gauge tramway was constructed in the quarry area so that loaded trucks ran downhill to the works. The empty trucks were returned to the quarry area using manpower. The tramway was very portable requiring little effort to move as the quarry face advanced.

The quarry site is the type locality for the Yarralumla formation. It is the locality where the formation is considered to be most developed and is thus the reference section against which all other outcrops of that unit are compared. Its importance results from its being the only fossiliferous, marine unit within the extensive volcanic marker horizons of South Canberra. The stratigraphy of the volcanic rocks and its fossil fauna provide evidence for the age of these volcanic. Within this place, three localities are of particular significance.

History:

The Minister for Home Affairs, Mr O'Malley, announced Government plans in 1910 to erect brickworks to provide bricks for the construction of the new Federal Capital. Following experiments on shale in the region, Campbell's Yarralumla property was found to be the most suitable and in 1913 the land was acquired for the brickworks site. In June 1913 a temporary plant was established and operational, comprising a grinding pan, brickmaking machine, elevator and portable steam engine. By August 1913 four open kilns were in use. This temporary plant had an output of 44,000-50,000 bricks per week, producing bricks for the Kingston powerhouse and setting aside others for the permanent brickworks.

A temporary plant was established and operating in June 1913. The first stage of the permanent brickworks, consisting of a single Staffordshire kiln, was approved in December 1913. This kiln was to produce bricks for two further kilns. The Staffordshire kiln, crushing and processing equipment and brick presses were completed and ready for production in 1916, however the commitments of the First World War and a restricted Canberra works program and coal strike led to the brickworks closing in late 1916.

In 1917, a Royal Commission investigated the brickworks following complaints from Walter Burley Griffin. A number of interesting points emerged as a result of the Commission's investigation. It found that 250,000 bricks made in the temporary kiln were of inferior and defective quality, so were used for filling and lining drains and for the new kilns, and not for building work as planned. In addition, the

Staffordshire kiln contained substantial evidence of construction errors in estimating and design.

At the end of 1920, the Government decided to proceed with the building of Canberra and the brickworks reopened in 1921. The brickworks railway was constructed in 1923 linking the works to the provisional Parliament House, the Kingston Power House and Hotel Canberra. A tramway also extended into the Civic Centre. The tramway was removed prior to the opening of Parliament House in 1927.

Throughout the 1920s the brickworks was expanded. Production was severely curtailed in 1929 however with the economic depression, and the railway was fully removed. Production subsequently ceased with the brickworks closing in February 1931. The brickworks opened again in 1935 only to close with World War Two as activity was diverted to works associated with the War.

The brickworks reopened in 1944 and beginning in 1954 major upgrading of the brickmaking facilities was undertaken including the construction of a 20 chamber 'Hoffman' kiln. Following the creation of the National Capital Development Commission in 1958, the two temporary downdraft kilns were demolished and replaced with three new kilns.

In 1960 the control of the brickworks was transferred to Commonwealth Brickworks (Canberra) Ltd. By 1973 the brickworks were considered to be in need of extensive modernisation. However upgrading proposals prepared by Commonwealth Brickworks were rejected by the National Capital Development Commission on environmental grounds and, in 1976, all reusable material was moved to a new site in Mitchell, ACT. The decision to relocate the brickworks was justified economically by anticipating the redevelopment of the site in a way which would recover relocation costs.

A private developer, A R Marr Pty Ltd, proposed to redevelop the site and adjacent land as a major tourist complex and in July 1979 the brickworks reopened as a tourist attraction. Extensive work was undertaken at the site but by 1980 A R Marr Pty Ltd was in provisional liquidation and in 1984 the lease was surrendered to the Commonwealth.

Condition and Integrity:

The structures comprising the brickworks range from good to poor condition. (1997)

Location:

About 9.6ha, off Denman Street, Yarralumla. Area comprises the whole of Blocks 1 and 20, Section 102. Includes former kilns, chimneys, fan houses and brickpits.

Bibliography:

Lester Firth Associates Pty Ltd 1986 'Old Canberra Brickworks Conservation Plan'
ACT Heritage Council, Citation for Yarralumla Brickworks, Yarralumla

Report Produced: Fri Mar 12 09:14:46 2010

Place Details

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Yarralumla Brickpits, Denman St, Yarralumla, ACT, Australia

Photographs:	None
List:	Register of the National Estate
Class:	Natural
Legal Status:	Registered (28/09/1982)
Place ID:	13319
Place File No:	8/01/000/0039

Statement of Significance:

The brickpits are of geological significance as the type locality for the Yarralumla Formation, a marine sequence of tuffaceous siltstone, sandstone, mudstone and limestone. Here the Yarralumla formation is considered to be most typically developed and is therefore the reference section against which all other outcrops are compared.

Official Values: Not Available

Description:

The four sites occur in the disused quarry of the Canberra Brickworks and all belong to the Yarralumla Formation. The rocks of the Yarralumla Formation are a sequence of tuffaceous siltstone, sandstone, mudstone and limestone, deposited in marine conditions during the Silurian period.

History: Not Available

Condition and Integrity:

The condition of the area is generally good though the anticline at Site A is obscured by pine trees and scree slopes.

Location:

Within the Yarralumla Brickworks, refer record 13318.

Bibliography:

HENDERSON, G.A.M., (IN PREP) - COMMENTARY ON THE COPPINS CROSSING
1:10,000 CANBERRA ENGINEERING GEOLOGY SHEET. TOWNLEY, K.A. & VEEVERS,
J.J., 1966 REVISED STRUSZ, D.L., 1974 - ROCKS AND FOSSILS AROUND
CANBERRA BUR. MINER. RESOUR. AUST.

Report Produced: Fri Mar 12 09:18:14 2010

APPENDIX B CONSERVATION WORKS SCHEDULES

CANBERRA BRICKWORKS

Scope and Methodology

A site survey of the remaining buildings at the former Canberra Brickworks was carried out on 17 February 2010 to assess the existing conditions and identify remedial work required to make the buildings stable and weather tight. The works identified are intended to conserve the buildings and slow any further deterioration in the short to medium term. The works are not intended to restore any of the buildings. Ongoing maintenance works will still be required.

All accessible areas of each building were inspected. No access was available to the interiors of the three downdraft kilns (Building 22) or the Workshop Building (Building 17). The vaulted kilns and firing floors were inspected for each of the three large kilns.

Summary of Condition

The buildings are mostly in reasonable condition. A number have suffered vandal damage, including broken windows and roof tiles. Most of the conveyor belt system and other equipment was removed following closure of the Brickworks, leaving openings in walls and roofs. Works, including replacement of some roofs, have been carried out to some of the buildings since the closure of the brickworks. Some of the more recent works were left unfinished, while other works such as the paving in the kilns have been partially removed.

Kiln 1, the Staffordshire Kiln (Building 4), has significant structural issues. Many of the kiln chambers are distorted although they appear to be stable at present. The arched entrance brickwork is failing in many of the chambers. These enlarged openings were later alterations to enable easier mechanical access to the chambers. The arched openings appear to have inadequate footings, probably due to movement in the flue tunnels beneath the outer walls of the kiln. Rebuilding of the worst of these is recommended in the near future.

No works are proposed for the crusher buildings, each of which is part demolished following the removal of conveyors and equipment. The partial demolition has resulted in missing sections of roof and walls but the remaining reinforced concrete and steel structures are likely to remain in fair condition for the medium term.

CANBERRA BRICKWORKS

Conservation Works Schedule

No.	Building No.	Building	Element	Works
1	3	Power House	Roof	Replace approx. 50 missing or broken marseilles pattern tiles
2	3	Power House	Gutters	Install new quad gutters
3	3	Power House	Fascias	Prepare and paint fascias and bargeboards
4	3	Power House	Eaves	Replace missing t&g eave lining boards
5	3	Power House	Eaves	Prepare and paint eave linings
6	3	Power House	Walls	Remove spray painted graffiti, wash down walls
7	3	Power House	Louvres	Replace 4 damaged louvres
8	3	Power House	Louvres	Prepare and paint louvres
9	3	Power House	Windows	Replace 6 missing windows
10	3	Power House	Windows	Prepare and paint windows
11	3	Power House	Doors	Replace damaged doors with new panelled doors with fanlight over
12	4	Kiln 1	N verandah	Replace decayed beams, rebuild collapsing north verandah/deck
13	4	Kiln 1	Chamber 1	Demolish recent brick wall and door in kiln entrance
14	4	Kiln 1	Chamber 1	Dismantle and rebuild outer 5 courses entrance arch
15	4	Kiln 1	Chamber 2	Dismantle and rebuild outer 5 courses entrance arch
16	4	Kiln 1	Chamber 3	Repoint entrance arch
17	4	Kiln 1	Chamber 4	Dismantle and rebuild outer 5 courses entrance arch
18	4	Kiln 1	Chamber 5	Dismantle and rebuild outer 5 courses entrance arch
19	4	Kiln 1	Chamber 6	Dismantle and rebuild outer 5 courses entrance arch
20	4	Kiln 1	Chamber 7	Dismantle and rebuild outer 5 courses entrance arch
21	4	Kiln 1	Chamber 8	Repoint entrance arch
22	4	Kiln 1	Chamber 9	Dismantle and rebuild outer 5 courses entrance arch
23	4	Kiln 1	Chamber 10	Dismantle and rebuild outer 5 courses entrance arch
24	4	Kiln 1	Chamber 13	Dismantle and rebuild outer 5 courses entrance arch
25	4	Kiln 1	Chamber 15	Remove concrete pavers from kiln floor
26	4	Kiln 1		Chambers 2, 4, 5, 6, 7 and 8 are significantly distorted but appear stable
27	5	Brick fanhouse	Gutters	Install new quad gutters and downpipes
28	5	Brick fanhouse	Fascias	Replace 5m missing fascia boards
29	5	Brick fanhouse	Fascias	Prepare and paint fascias
30	5	Brick fanhouse	Eaves	Replace 4m2 t&g eaves lining boards
31	5	Brick fanhouse	Eaves	Prepare and paint eaves
32	5	Brick fanhouse	Windows	Install 10 new sashes and reglaze all windows
33	5	Brick fanhouse	Windows	Prepare and paint windows
34	5	Brick fanhouse	Doors	Replace missing doors

APPENDIX B

No.	Building No.	Building	Element	Works
35	5	Brick fanhouse	Doors	Prepare and paint doors
36	5	Brick fanhouse	Ceiling	Replace 60% of t&g ceiling lining boards
37	5	Brick fanhouse	Floor	Drain pits and clear debris
38				
39	6	Chimney & kiln	Chimney	Replace missing bricks and repoint top 8 courses of chimney
40	6	Chimney & kiln	Test kiln	Remove vegetation from roof of kiln, re-render roof and repoint door arch.
41	7	Office	Additions	Demolish flat roofed additions to 3 sides of original office building.
42	7	Office	Roof	Replace missing and broken marseille pattern tiles. Rebatten and install tiles along lower courses following removal of skillion roofs.
43	7	Office	Windows	Install new windows to match original windows
44	7	Office	Doors	Alter brickwork to reopen original doorways. Install new doors to match original doors.
45	7	Office	Joinery	Prepare and paint all external timberwork.
46	8	Kiln 2	Roof	Replace broken fibreglass skylight sheet
47	8	Kiln 2	Gutters	Install gutters.
48	8	Kiln 2	Windows	Reglaze all steel framed windows with Georgian wired glass
49	8	Kiln 2	Windows	Prepare and paint all steel framed windows
50	8	Kiln 2	Wall cladding	Clad centre of south upper wall with corrugated galvanised steel
51	8	Kiln 2	Wall	Remove efflorescence from west end internal kiln wall
52	8	Kiln 2	Internal	Demolish recent brick internal partition walls from within kiln chambers
53	8	Kiln 2	Internal	Remove concrete pavers from kiln floor
54	8	Kiln 2	Internal	Clear plasterboard and damaged insulation from firing floor and ceiling
55	8	Kiln 2	Internal	Remove electrical wiring and conduits
56	9	Fan Houses	Roof A	Replace CGI roof and gutters
57	9	Fan Houses	Roof B	Replace CGI roof and gutters
58	9	Fan Houses	Walls	Replace missing cladding to Fan house 8B
59	9	Fan Houses	Windows	Replace missing windows with matching 4 pane sash windows
60	9	Fan Houses	Doors	Replace missing doors and architraves
61	9	Fan Houses	Exterior	Prepare and paint fascias, windows and doors
62	9	Fan Houses	Interior	Clear out debris and blackberry bushes.
63	9	Fan Houses	Exterior	Clear drain channels and surroundings
64	10	Chimney	Chimney	Repoint top 5 courses of brickwork.
65	11	Amenities	Windows	Replace missing glazing, prepare and paint windows
66	11	Amenities	Doors	Replace/repair doors. Prepare and paint doors
67	11	Amenities	Fascias	Prepare and paint all external joinery
68				
69	12	Kiln 3	Roof	Replace 30m2 fire damaged CGI roof
70	12	Kiln 3	Downpipes	Replace downpipes at west end of south side to drain at outer edge of verandah roofs

CANBERRA BRICKWORKS

No.	Building No.	Building	Element	Works
71	12	Kiln 3	Structure	Repair/replace 2 fire damaged Oregon trusses
72	12	Kiln 3	Structure	Replace 30m Oregon purlins
73	12	Kiln 3	Structure	Replace 2 fire damaged 200 x 200 Oregon posts
74	12	Kiln 3	Structure	Replace 10m fire damaged stud wall and doorway
75	12	Kiln 3	Structure	Repair and reroof operators room on north side
76	12	Kiln 3	Windows	Reglaze 33 steel framed windows with frosted Georgian wired glass
77	12	Kiln 3	Windows	Prepare and paint 33 steel framed windows
78	12	Kiln 3	Pipework	Remove and dispose of asbestos lagging from pipes at east end
79	12	Kiln 3	Verandah	Replace missing 12m of north verandah roof with new CGI
80	12	Kiln 3	Verandah	Install roof and structure to west end or demolish steel posts and beam
81	12	Kiln 3	Floor	Remove concrete pavers from kiln floor
82	14	Machine Bldg 1	Skylights	Replace broken glass skylights
83	14	Machine Bldg 1	Windows	Replace missing glass in all windows
84	15	Machine Bldg 2	Skylights	Replace broken glass skylights
85	15	Machine Bldg 2	Windows	Replace missing glass in all windows
86	15	Machine Bldg 2	Roof	Replace missing CGI sheets
87	16	Machine Bldg 3	Skylights	Replace broken glass skylights
88	16	Machine Bldg 3	Windows	Replace missing glass in all windows
89	16	Machine Bldg 3	Cladding	Replace 2 sheets east wall cladding
90	17	Workshop	Note	No Access - Works?
91	18	Crusher 1		Part demolished - no works
92	19	Crusher 2		Part demolished - no works
93	20	Crusher 3	Roof	Replace missing CGI roofing over hopper
94	21	Conveyor		Part demolished - no works
95	22	Downdraft Kilns	Note	No access to kiln interiors
96	22	Downdraft Kilns	Exterior	Repoint cracks in all 3 kilns
97	24	Chimney	Brickwork	Replace 40 spalling bricks with new matching bricks

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**Remedial Action Plan
Stage 1 and 2
(Includes Hazardous Materials)**

**Canberra Brickworks Remediation Project
Block 1 Section 102 Yarralumla
Canberra Central ACT**

July 2014



Client: Capezio and Co
Unit 2/2 Yallourn Street
Fyshwick ACT 2609



CERTIFICATE OF APPROVAL FOR ISSUE OF DOCUMENTS

Document No: 9623_EAR_RAP_Ver 4_20140730.docx **Revision Status:** A1

Title: Remedial Action Plan
Canberra Brickworks Remediation Project
Block 1, Section 102, Yarralumla ACT
Canberra Central **Date of Issue:** 30/7/2014

Client: Capezio and CO **Copy No:** One

	Name	Position	Signature	Date
Prepared by:	Ben Kendon	Senior Consultant	<i>Ben Kendon</i>	30/07/2014
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EXECUTIVE SUMMARY

Capezio and Co Pty Ltd have engaged Robson Environmental Pty Ltd (Robson) to prepare and update this Remedial Action Plan (RAP) for the remediation of the asbestos dump ('AD') and associated impacted soil. The majority of the material is located in the centre of the western boundary of the Canberra Brickworks site, Block 1 Section 102 Yarralumla ACT 2600 (Canberra Central) Novar Street Yarralumla ACT 2600. However, the western side of the dump encroaches on the adjoining block (s), Public Land, Block 20 Section 102 and possibly Block 1 Section 127 (herein referred to as 'the site').

The objectives of this RAP are to:

- Develop a cost effective, risk-based strategy for the implementation of remediation measures that will eliminate or reduce the risk of soil contamination in 'AD' that may impact potential receptors;
- Specify the remediation goals; and
- Ensure that the planned remedial activities for the site are to a level acceptable for the proposed land use.

Robson understands that Capezio on behalf of the ACT Property Group is intending to undertake works to remove the 'AD' in preparation for long term redevelopment plans for the site.

As the 'AD' is known to be impacted with asbestos all remedial works will be undertaken under asbestos removal conditions as established by an ACT Licensed Asbestos Removalist and a Class 'A' Asbestos Assessor.

Due to the uncertainty related to the character and extent of the 'AD' Robson proposes to achieve remediation of the area of impact in two (2) distinct Stages as outlined below:

Stage 1

- Site establishment will include the set up of perimeter fencing, signage, amenities, erosion and sediment controls, internal work site zones and haulage route.
- Remove and stockpile blackberry vine and other ground cover vegetation.
- Remove all visible asbestos sheet waste and building waste from the surface of the 'AD' to enable further assessment.
- Undertake an environmental site assessment (ESA) with aim of refining the characterisation of the 'AD' to determine the appropriate remedial method.

Stage 2

- Based on the outcome of the ESA amend the RAP to reflect the findings and the proposed remedial option.
- Implement the approved RAP to achieve the remedial goal.

- Emplacement of a geotextile marker barrier (if asbestos material or other contaminants are known to be present below the final required excavation levels that cannot or it is not necessary to remove);
- Importation of suitable fill material for reinstatement of the site to the required design levels;
- A suite of management activities to reduce the potential impact of the remedial works on sensitive receptors and the surrounding environment.

At this stage it is understood that the end land use in this location will be high density residential. Thus, it is considered that the applicable human health assessment criteria for soils on the site is the Health-based Investigation Level (HIL) 'B' – (*Residential with minimal opportunities for soil access includes dwellings with fully and permanently paved yard space such as high-rise buildings and flats*). This criteria have been sourced from the ACT ESDD endorsed guideline NEPC (1999) 'National Environment Protection (Assessment of Site Contamination) Measure 1999' (amended version of 2013, herein referred to as the ASC NEPM (2013)).

A summary of the proposed remediation works to be undertaken with the aim of making the site suitable for Residential HIL 'B' Land Use is presented below in **Table A**.

It is concluded that implementation of the works proposed in this RAP will assist in making the site suitable for the proposed land use. This RAP has been prepared in accordance with the NSW Office of Environment and Heritage (OEH, 2011) 'Guidelines for Consultants Reporting on Contaminated Sites'.

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Table A: Proposed Remedial Activities

Stage	Activity
1-1 – Site Setup	Set up excavation area including fencing to prevent public access with appropriate signage and site amenities; Set up the decontamination zone; Set up sediment and erosion control measures (as required) including the use of hay bales, sediment fences and black plastic under and around stockpile areas; and Establish clearly defined haul routes for the transport of asbestos materials, recyclable and non-recyclable building materials and soil off the site;
1-2 - Removal of blackberry and other vegetation	Set up airborne fibre monitoring for asbestos (required during all remediation activity including vegetation removal); Remove all vegetation and stockpile - Ensure water is available to control dust levels at all times (dust not to be

Stage	Activity
	visible during the works); Cover stockpile(s) with plastic sheeting where asbestos materials are visible; and Based on site observations determine whether the vegetation may be disposed of as asbestos waste or green waste.
1-3 - Removal of the ACM	Set up airborne fibre monitoring; Remove visible asbestos materials; These materials must be double wrapped with plastic or loaded directly into approved asbestos transport vehicle (plastic lined, covered, leak proof and appropriately labelled) for transport to the approved destination (e.g. licensed waste facility).
1-4 – Environmental Site Assessment	Set up airborne fibre monitoring; Undertake an Environmental Site Assessment (ESA) with aim of refining the characterisation of the 'AD' to determine the appropriate remedial method.
1-5 – Revise RAP	Based on the outcome of the ESA amend the RAP to reflect the findings and the proposed remedial option.
Anticipated Remedial Activities for Stage 2 Works	
2-1 - Removal of impacted soil	Based on the outcome of the ESA amend waste handling activities to address the contaminants of concern. The activities are likely to include: Air monitoring; The covering and stockpile(s) with plastic sheeting; and Upon receipt of approval from the ACT ES (Environmental Standards), the removal of the soil waste from site for beneficial reuse (BRU) (on or off site) or for disposal to a landfill or an approved containment cell. If contaminated, the soil should be loaded into leak proof trucks for transport to the approved destination (e.g. licensed waste facility).
2-2 - Validation Sampling	Set up air monitoring; Validation sampling and an asbestos clearance inspection of the remediated area on completion of works if all observed asbestos containing material (ACM) impacted soil is removed; Installation of a permeable geotextile barrier (if required) as an indicator of the presence of underlying impacted soil. Undertake a visual clearance and validation sampling of the

Stage	Activity
	<p>haul route (within the remedial area) for asbestos following a 100mm scrape; and</p> <p>In the event of a spill of hydrocarbon (e.g. fuel or oil from mobile plant) or contaminated soil, validation sampling of the impacted area would be undertaken for contaminants of potential concern.</p>
<p>3 – Reinstatement with suitable fill material</p>	<p>Identify source of fill material and assess the suitability (from an environmental perspective) of the material. Obtain ACT ES approval and Auditor endorsement for BRU of the material on the site. Assessment and gaining ACT ES approval should be undertaken before importation of the material.</p> <p>Import material, place over a geotextile barrier (if present) and backfill to geotechnical requirements to the design levels.</p> <p>Maintain sediment and erosion control measures (as required).</p>

1 INTRODUCTION

Capezio and Co Pty Ltd have engaged Robson Environmental Pty Ltd (Robson) to prepare this updated Remedial Action Plan (RAP) for the remediation of the asbestos dump ('AD') and associated impacted soil. The majority of the dumped material is located in the centre of the western boundary of the Canberra Brickworks site, Block 1 Section 102 Yarralumla ACT 2600 (Canberra Central) Novar Street Yarralumla ACT 2600. However, the western side of the dump encroaches on the adjoining block(s), Public Land, Block 20 Section 102 and possibly Block 1 Section 127 Yarralumla (herein referred to as 'the site').

The location of the site is shown in **Figure 1** and a detailed site plan is provided in **Figure 2**.

Robson understands that Capezio and Co Pty Ltd is intending to undertake works on behalf of ACT Property Group (ACTPG) to remove the 'AD' in preparation for redevelopment plans which includes high density residential land use for the site.

The site, the Canberra Brickworks, operated as Brickworks between 1913 and 1976. Based on this known manufacturing process the site may have been impacted by a range of industrial contaminants primarily, hydrocarbons, polycyclic aromatic hydrocarbons and heavy metals. Other activities that may have caused on site contamination include the use of explosives for generating raw material for the bricks, pesticides and herbicides used to maintain the grounds and the use of hazardous materials in the construction of the buildings, for example asbestos. Since the brickworks ceased operation in the 1976 the site has been used by various lessees for commercial purposes. The current lessee Thor's Hammer runs a large scale recycled timber business. In the 1970s perhaps due to on-site renovation and poor management practices the western boundary of the site was apparently used as a dump site which is the focus of this RAP. Based on aerial photographs the dump becomes apparent in the 1980s. It is understood that hazardous materials have been dumped in this location, predominantly asbestos. Also, it is thought that the origin of a proportion of the asbestos waste may have come from external sources.

In August 2006 an Environmental Audit was undertaken by Robson Laboratories Pty Ltd of the Canberra Brickworks Site and reconfirmed the location of the 'AD'. Shallow drilling was undertaken on the eastern boundary of the site for environmental sampling purposes and no other industrial contaminants were detected in the soil at concentrations above the sensitive land use criteria (Residential 'HIL A' Land Use). The sensitive land use criteria were applied in this Audit to allow flexibility for future land use.

In early 2007 a RAP was prepared by Robson Laboratories Pty Ltd. The project was halted as the ACT Planning and Land Authority (ACTPLA) determined that Development Approval would be required for a remedial project of this size and the perceived likely increase in cost associated with the volume of asbestos materials observed in the dump following the removal of vegetation cover.

A consequence of the partial implementation of the RAP in 2007 was soil samples were able to be taken from within the dump. The analytical results further demonstrated that the likely dominant contaminant of concern was asbestos.

In addition to the above, Robson also understands that a NSW Environment Protection Authority (EPA) accredited Contaminated Sites Auditor has been engaged to review and provide comment on the work conducted by the environmental consultant in accordance with the NSW Department of Environment and Heritage (DEC, 2006) '*Guidelines for the NSW Site Auditor Scheme (2nd Edition*)' as a part of a non-statutory audit. The site audit boundary has yet to be determined as it is likely to be inclusive of part of the Yarralumla Brickworks site (Block 1 Section 102 Yarralumla ACT 2600). Further the dump encroaches on the adjoining block(s), Public Land, Block 20 Section 102 and possibly Block 1 Section 127.

This RAP has been prepared in accordance with the NSW Office of Environment and Heritage (OEHL, 2011) '*Guidelines for Consultants Reporting on Contaminated Sites*' and presents a proposed staged remediation and validation strategy to allow the site to be considered suitable for the proposed Residential 'HIL B' land use.

1.1 Objectives

The objectives of this RAP are to:

- Develop a cost effective, risk-based strategy for the implementation of remediation measures that will permit safe access to the 'AD' area to allow further investigation (Environmental Site Assessment (ESA)) with the aim of improving the characterisation of the 'AD'.
- Based on the outcome of the ESA revise the RAP to achieve a cost effective, risk-based strategy for the implementation of remediation measures that will eliminate or reduce the risk of soil contamination in the 'AD' area that may impact potential receptors;
- Specify the remediation goals for Stage 1 and Stage 2; and
- Ensure that the planned remedial activities for the site are to a level acceptable for the proposed site use.

1.2 Scope of Works

To achieve the above objectives, the following scope of work has been undertaken:

- Review of site details, proposed development and land use;
- Review of the available reports from previous environmental assessments;
- Assessment of the remedial goals and options with regard to making the site suitable (from an environmental perspective) for the proposed land use;
- Definition of the data quality objectives (DQOs) for the proposed soil remedial works (based on the current knowledge of the 'AD');
- Presentation of a management plan for vegetation / soil contamination and waste water including:

- Preparation of temporary stockpiling locations to control surface water and sediment run-off from impacted soils;
- The stockpiling of potentially contaminated vegetation and soils for further assessment;
- Requirements for assessing waste soil for off-site disposal of waste or other possible remedial methods;
- Presentation of site controls to minimise the impact of remedial activities on the surrounding environment (i.e. neighbouring land) and ensure the health and safety of the workers on site and the general public;
- Present an occupational health and safety plan for the proposed remediation works to assist with the protection of site workers, site visitors and other people in the vicinity of the site.

1.3 Regulatory Compliance

This RAP has been prepared in general accordance with the following legislation and guidelines endorsed by the ACT EPA:

- ACT Government (1997) '*Environment Protection Act 1997*';
- ACT Government (2005) '*Environment Protection Regulation 2005*';
- ACT EPA (2009) '*Contaminated Sites - Environment Protection Policy*';
- ACT EPA (2011) '*Environment Protection Guidelines for Construction and Land Development in the ACT*';
- ACT ESDD (2014) '*Information Sheet 4 - Requirements for the reuse and disposal of contaminated soil in the ACT*';
- ACT ESDD (2014) '*Information Sheet 5 Requirements for the transport and disposal of asbestos contaminated wastes*';
- ACT ESDD (2014) '*Information Sheet 6 - Management of small scale, low risk soil asbestos contamination*';
- ACT ESDD (2014) '*Addendum - Contaminated Sites Environment Protection Policy*';
- Australian Standard AS 4482.1-2005 '*Guide to the investigation and sampling of sites with potentially contaminated soil – Part 1: Non-volatile and semi-volatile compounds*';
- Environment ACT (2000) '*ACT's Environmental Standards: Assessment & Classification of Liquid & Non-liquid Waste*';
- National Environment Protection Council (NEPC, 1999) '*National Environment Protection (Assessment of Site Contamination) Measure 1999*' (Revised 2013 and herein referred to as the ASC NEPM (2013));
- NSW EPA (1995) '*Sampling Design Guidelines*';
- NSW OEH (2011) '*Guidelines for Consultants Reporting on Contaminated Sites*'.
- Western Australia Department of Health (DOH, 2009) '*Guidelines for the*



*Assessment, Remediation and Management of Asbestos-Contaminated Sites
in Western Australia' (WA Guidelines).*

2 SITE INFORMATION

General details regarding the site are summarised in **Table B** below.

Table B: Summary of Site Details.

Site Name	'Asbestos Dump' ('AD') – Western boundary of the Canberra Brickworks (Block 1 Section 102) and the adjoining block(s), Public Land, Block 20 Section 102 and possibly Block 1 Section 127.
Site Address	Canberra Brickworks, Denman Street, Yarralumla ACT
Title Identification	Part of Block 1 Section 102 Yarralumla, ACT Canberra Central Block 764
Site Area	The 'AD' has an area of approximately 0.45 hectares
Current Zoning	According to the ACT Territory Plan which is administered by the ACT Planning and Land Authority (ACTPLA), the site is currently zoned as Rural RZ1: SUBURBAN; CZ6: LEISURE AND ACCOMMODATION Site uses allowed by the current zoning are presented in Appendix A .
Current Site Use	Wholesale, retail outlet for recycled timber (Thor's Hammer)
Proposed Site Use	To be confirmed but for the purposes of this RAP Robson understands the proposed site use will be Residential HIL 'B'.

2.1 Site Description

The site forms a portion of the Yarralumla Brickworks and is located on the western boundary of the Brickworks. A plan of the site showing the Blocks, zones and boundary survey information is provided in **Figure 2**.

The Asbestos Dump ('AD')

The 'AD' covers an area of approximately 0.45 Hectares within the Canberra Brickworks and is secured by a lockable chain wire fence on the east side and a damaged chain wire fence which delineates the western boundary. The 'AD' is obscured by blackberry vines, deciduous trees and large pines on the southwest corner of the site. The site is bisected by a dry water course which may at one stage have been engineered as a stormwater channel.

The 'AD' is best accessed from the south end and is characterised by vegetation, obvious mounds and pits of buried waste before the dump levels out along the western boundary of the site. The boundary abuts onto a thin strip of public land (Block 1 Section 127 Yarralumla) which also shows signs of fill which is suspected to be encroachment from the 'AD' which separates it from Royal Canberra Golf

Course where the stormwater drain is clearly visible. Private residential properties are present on the north side of the 'AD' on Lane Poole Place.

The visible waste in the dump includes Asbestos sheeting, metal, rubber, plastic and brick waste (refer **Appendix B** for Photographs).

The Brickworks

The Canberra Brickworks site is identified as Block 1 Section 102 Yarralumla and covers 9.6 hectares approximately 4.8 km southwest of Canberra City. The site slopes to the west and is bounded by a golf course to the west and residential land in all other directions. Apart from the built up areas (Kilns etc) on the central west side of the site, large pine trees line the perimeter of brickworks.

The site is bounded by the Royal Canberra Golf course to the west, Lane Poole Place and Bentham Street to the North, Schomburgk and Woollis Street to the East and South. The site may be accessed by Denman Street at the south end and is secured by a new black iron fence.

The site has two (2) distinct areas, the west side which is defined by the kiln buildings and workshops and the east side which comprises the quarry. The quarry floor is dominated by a man made lake which was mostly dry at the time of the investigation 2006.

Large areas of the site have been filled with either quarry tailings or brick waste generated from the brick manufacturing processes.

2.2 Heritage

This RAP has been designed in consultation with ACT Heritage Council as it is known that the Yarralumla Brickworks Site is listed on the ACT Heritage Register under the ACT Heritage Act 2004. The heritage items (buildings) have been identified within the facility adjacent the proposed remediation works and will be clearly marked and protected with temporary fencing for the duration of the remedial works.

The Project Manager (Capezio and Co) has engaged an archaeologist to be available during the works if an assessment of an area affected by the remediation works is required.

2.3 Topography

The 'AD' is approximately 580m the Australian Height Datum (AHD) and is generally flat with a western slope towards the Royal Canberra Golf Course and appears to be located on top of what might be an old stormwater drain which is in line with a now redundant septic tank. The nearest surface water body is Warrina Inlet of Lake Burley Griffin which is approximately 600m northwest of the site.

2.4 Hydrology

Canberra has an average annual rainfall of 629mm with most of the rain falling between the months of March and May and September to November.

The dump site is unsealed and well vegetated and slopes to the west. Runoff from the sites is expected to be minimal except in very wet conditions when the soil becomes saturated. Drainage is expected to follow the old stormwater drain therefore contamination (if any) would be expected to follow the drain to the west toward Lake Burley Griffin.

2.5 Geology

Reference to the Bureau of Mineral Resources, Geology and Geophysics 1:100,000 scale Geological Series Sheet 'Canberra' (Sheet 8727, 1992) indicates that the site is underlain by the Yarralumla Formation. The formation is described as a calcareous and tuffaceous mudstone and siltstone, with minor limestone, calc-silicate hornfels and quartz sandstone which is a suite of sedimentary deposits Silurian in age (425 m.y.).

As discussed further in **Section 3**, an environmental audit was undertaken in 2006 and a number of boreholes were located along the east side of the dump. Further, during the initial phase of the dump remediation in 2007, a number of test pits were dug in the dump itself. Based on the bore hole data and test pit data, the fill soil was found to be approximately 2.5 m – 3 m deep overlying brown clays and yellow siltstone.

2.6 Hydrogeology

Reference to the Bureau of Mineral Resources, Geology and Geophysics (1984) 1:100,000 scale map '*Hydrogeology of the Australian Capital Territory and Environs*' indicates that the groundwater is anticipated to be hosted in a fractured rock aquifer. High yielding zones would be associated with upper and lower portions of the individual ash-flow tuffs and interbedded sediments.

The groundwater yield beneath the site is estimated to be between 0.5 litres per second (L/sec) and 1.0 L/sec, while the concentration of total dissolved solids (TDS) is estimated to be less than 500 milligrams per litre (mg/L).

Based on previous site investigations groundwater was not encountered in any of the boreholes or test pits. However, as the area of concern may have landfill characteristics, there is the potential for perched water table to be present within or at the base of the fill material which may be contaminated. Therefore, this feature has been included in the Conceptual Site Model (CSM) to ensure this feature is considered during the proposed remedial works.

2.7 Surrounding Land Uses

The land uses surrounding the site are summarised in **Table C** below.

Table C: Summary of Surrounding Land Uses.

Direction from Site	Site Use	Description of Site Use
North	Residential	Lane Poole Place This area is Zoned 'RZ1 – Suburban
East	Brickworks infrastructure and Thor's Hammer recycled wood centre.	This area is the Canberra Brickworks site and is zoned as Rural RZ1: SUBURBAN; CZ6: LEISURE AND ACCOMMODATION.
South	Restricted Open Space, Public Space and Designated Land	This land is undeveloped and is currently zoned accordingly: Directly south of the site: Block 7 Section 102 - CZ6: LEISURE AND ACCOMMODATION; PRZ2: RESTRICTED ACCESS RECREATION ZONE Block 1 Section 127 - PRZ2: RESTRICTED ACCESS RECREATION ZONE; DES: DESIGNATED
West	Two (2) blocks defined as Open Public Space are located directly adjacent the site and the Royal Canberra Golf Course.	This land is undeveloped and is currently zoned accordingly: Block 1 Section 127 - PRZ2: RESTRICTED ACCESS RECREATION ZONE; DES: DESIGNATED Block 2 Section 19 – DES: DESIGNATED

2.8 Proposed Redevelopment

Robson understands that the aim at this stage in the planning process is to remediate the 'AD' which would include the reinstatement of the area to permit high density residential land use as defined by the ASC NEPM (2013) as Health Investigation Level HIL'B' – *'Residential with minimal opportunities for soil access includes dwellings with fully and permanently paved yard space such as high-rise buildings and flats'*.

2.9 Approvals and Licensing

2.9.1 Removal of Contaminated Soils

The main legislation in the ACT relating to contaminated sites is the *Environment Protection Act 1997*, administered by the ACT EPA. For contamination issues the EPA has developed the ACT EPA (2009) '*Contaminated Sites - Environment Protection Policy*'. For asbestos issues the EPA has endorsed use of the WA Guidelines which has since been adopted by the ASC NEPM (2013). In addition to the above, asbestos related work practices are regulated under the *Dangerous Substances Act 2004*, administered by the Office of Regulatory Services (ORS). In the ACT asbestos waste is classified as Industrial Waste and must be handled, transported and disposed of in accordance with the National Occupational Health and Safety Commission (NOHSC) *Code of Practice for the Safe Removal of Asbestos, second edition April 2005* (the Code).

Further, all asbestos works at a site containing soil asbestos contamination including the removal of the vegetation must be undertaken by ACT licensed asbestos removalists. The removalist must hold a current ACT Class A Asbestos Removal License as issued under the *ACT Construction Occupations (Licensing) Act 2004*.

For example, during the removal the vegetation cover, the asbestos materials and potentially impacted soil must be handled and supervised by an ACT licensed asbestos removalist and management measures implemented to minimise the release of asbestos fibres, and thus protect site personnel and the public.

2.9.2 Off-Site Waste Disposal

Solid Wastes

Off/on-site BRU and / or disposal of soil to a land fill or an approved containment cell, including asbestos impacted soil, will require Auditor endorsement and EPA approval.

In explanation, prior to the disposal of soil or building waste off site, the material must be assessed by an Environmental Scientist and based on the assessment, approvals must be sought from the ACT Environmental Standards (ES) and the approval will be based on applications which must be in accordance with the ACT ESDD (2014) '*Information Sheet 4 - Requirements for the reuse and disposal of contaminated soil in the ACT*'.

The NSW EPA Accredited Auditors role is to make comment on the Environmental Consultants methodology for requesting the off-site disposal with regard to the overall remediation strategy. The Auditor is also responsible for verifying that the scheduled remediation has been completed in accordance with the RAP. At no time shall the Auditor grant approval for off-site disposal of waste as this is the responsibility of the ACT ES.

The disposal of asbestos is regulated under the *Environment Protection Act 1997* and *Environment ACT (2000) 'ACT's Environmental Standards: Assessment & Classification of Liquid & Non-Liquid Wastes'*.

The transport of asbestos and asbestos products is regulated under the *Dangerous Goods (Road Transport) Act 2009* and must be undertaken in accordance with the *ACT ESDD (2014) Information Sheet 5 - Requirements for the Transport and Disposal of Asbestos (Refer Appendix C and D)*.

Liquid Wastes

The types of liquid waste that may be encountered during remedial works is chemical waste in dumped drums/ tanks or as groundwater. If such wastes are encountered and disposal is required the Auditor should be informed. Prior to disposal, the liquid waste must be classified by the Environmental Scientist in accordance with *Environment ACT (2000) 'ACT's Environmental Standards: Assessment & Classification of Liquid & Non-Liquid Wastes'*. Based on classification, if the waste is to be discharged to stormwater approval from ACT ES is required and if discharging to sewer approval from ACTEW is required. Liquids that cannot be discharged to natural waters or the sewer may be subject to authorisation under the *Environment Protection Act 1997*.

3 PREVIOUS ENVIRONMENTAL ASSESSMENTS AND REPORTS

It is understood that the previous environmental site assessments (ESA's) and reports were prepared for the Yarralumla Brickworks and are not specific to the 'AD'. However, all reports have been included as aspects of the studies have addressed 'AD'.

- Connell and Wagner 2001 - *Appendix F-Brickworks Contamination Report*
- Robson Laboratories Pty Ltd (October 2006) '*Environmental Investigation – Audit Report Yarralumla Brickworks Block 1 Section 102 Yarralumla Canberra Central ACT*' (Robson reference 3144_CL_EI Final_20061018).
- Robson Laboratories Pty Ltd (2007) '*Remediation Action Plan - Asbestos Dump Yarralumla Brickworks Block 1 Section 102 Yarralumla Canberra Central ACT*' (Robson reference 3144_CL_RAP_20070612).

A summary of each of these reports is presented below.

3.1 Summary of Previous Assessment Reports

3.1.1 Connell Wagner Report Dated 2001

The study was a preliminary (Phase 1) assessment of potential site contamination and was part of a Development Control Plan (DCP) commissioned by the ACT Government. The assessment was based on interviews with persons who worked on the brickworks and a desktop study which undertook the review of available historic information.

The study identified a number of locations on the site which could be sources of on-site contamination but did not identify any potential off-site contamination sources.

The potential on-site sources of contamination identified included:

- Coal and Oil Storage Bunkers (NE5);
- Forklift Shed (A6);
- Model Railway Workshops (M1-M3);
- Septic Tank (ST);
- Blacksmiths Shop (M1-M3);
- Explosive Storage Area (ES);
- General fill on the site; and
- The Asbestos Dump.

The report also makes comment on the likely presence of above ground hazardous material in buildings and that the site has been filled in places with materials that have been sourced from the site.

The report concludes that it is probably suitable for its intended site use (a commercial and recreational facility) provided the potential sources of contamination are investigated in accordance with Environment ACT requirements.

3.1.2 Robson Report Dated October 2006

In 2006 Robson was engaged by ACT Property Group to undertake a limited Environmental Investigation of the Brickworks site. The Connell Wagner (CW) report had identified the 'AD' as one of the Areas of Environmental Concern (AEC) which is the focus of this RAP. Therefore, only the results related to the AD are briefly discussed below.

Due to access difficulties only the eastern boundary of the AD was investigated. Two (2) bore holes (BH4 and BH5 (BH5A)) were drilled to auger refusal and two (2) soils samples were taken from each and analysed for a selection of the following contaminants: Total Petroleum Hydrocarbons (TPH), Polycyclic Aromatic Hydrocarbons (PAH), Organochlorine Pesticides (OCP), Polychlorinated Biphenyls (PCB), Eight (8) Heavy Metals Arsenic (As), Cadmium (Cd), Chromium (Cr), Copper (Cu), Mercury (Hg), Lead (Pb), Nickel (Ni) and Zinc (Zn) and Asbestos. Contaminants of concern were not identified above the assessment criteria (Residential 'HIL A' Land Use) in these locations.

3.1.3 Robson Report Dated June 2007

Based on the recommendations from the Robson (2006) limited Environmental Investigation, a RAP was developed for the removal of the asbestos waste from the 'AD'. The RAP was only partly implemented as the project was stopped by the ACT Planning and Land Association (ACTPLA) due to the requirement for Development Approval to be in place when removing significant quantities of soil. The work allowed for an improved assessment of the extent of the 'AD' and limited soil sampling from test pits and a stockpile within the 'AD'. The information gleaned from the implementation of the RAP has not been presented in a report format. However, the observations and a brief discussion of the analytical results are presented below.

Field Observations

Following the removal of the vegetation primarily blackberry vines corrugated asbestos sheeting was visible and accessible. Manual removal of the sheeting was undertaken and up to 50 tonnes of sheeting was successfully removed. Apart from the asbestos and fill (general builders waste including brick, concrete, metal (car bodies), tyres and wood), evidence of other contaminants of concern (staining, olfactory indicators) were not observed.

As the dump was accessible, a number of test pits were excavated across the mounded dump surface which included stockpiles created by the earthworks undertaken as part of this remediation phase of the 'AD'. The test pits were generally located in the southwest corner and representative soil samples were taken from these and from one (1) Stockpile (SP1). In summary six (6) soil samples were taken from six (6) locations from varying depths across the accessible part of the AD. The field work was undertaken on the 18 June 2007. The waste materials described in the fill included: brick, concrete, ash, plastic and asbestos as sheet fragments and millboard insulation (friable asbestos).

The soil samples were analysed for the following contaminants of concern: TPH, PAH, Heavy Metals (As, Cd, Cr, Cu, Hg, Pb, Ni & Zn), Organochlorine Pesticides (OC), Polychlorinated Biphenyls (PCB) and Asbestos.

Analytical Results

Asbestos fibre in soil was identified in the soil in four (4) of the six (6) soil samples and a low concentration of Total Petroleum Hydrocarbons (TPH) (110mg/kg TPH - C₂₉-C₃₆) was identified in the soil sample taken from one location (Test Pit 1). Apart from the asbestos all other contaminants of concern were below the assessment criteria.

3.2 Summary of Known Soil Contamination

Based on field observations and limited analytical data, the soils associated with the 'AD' are impacted with asbestos sheet fragments and fibre bundles. At present the concentration of bonded or friable asbestos in soil is not known.

The impact from other industrial contaminants of concern appear to be unlikely based on the limited analytical data that is available. Despite this all subsequent soil assessments and site validation must include the other common industrial contaminants of concern which are: TRH, BTEX, PAH, Phenols, OCP, PCB and eight (8) Metals. In addition, contaminants associated with other known contaminant sources that have been previously identified at the Brickworks include an explosive store and a septic system (present in the 'AD') and possible municipal waste.

Robson considers the likelihood of contaminants related to explosives and municipal waste to be present in the dump to be remote as such sources were not identified in the Environmental Audit undertaken by Robson in 2006 (Robson reference 3144_CL_EI Final_20061018) nor during the part implementation of the RAP in 2007 (Robson reference 3144_CL_RAP_20070612).

A septic system is known to be present within the 'AD'. Robson understands the septic system is not currently in use and has not been in use for some years. Therefore, the likelihood of significant volumes of sewage is considered to be unlikely and further pathogens such as E.coli biodegrade, therefore Robson does not consider it to be significant health or environmental risk.

However, as a precautionary measure during the course of the Stage 1 of the RAP, if field investigations reveal evidence to suggest such sources as described above, the Contaminants of Concern (CoC) should be adjusted to accommodate such finds. These include the following:

- Explosive Screen ; and
- E coli, Faecal Coliforms and Total Coliforms.

Due to these unknowns, an Environmental Site Assessment (ESA) must be undertaken upon the completion of the removal of all surface accessible asbestos

containing material (Stage 1-3). The aim of the investigation will be to refine the characterisation of the dump to determine the appropriate remedial method.

4 REMEDIAL GOALS AND OPTIONS

4.1 Remediation Goals

The overall goals of the proposed remedial works are to remediate the site to a level acceptable for Residential Land Use (HIL 'B'), and whilst doing so to not have a deleterious impact on human health and the environment.

The definition of Health-based Investigation Level (HIL) 'B' is – *'Residential with minimal opportunities for soil access includes dwellings with fully and permanently paved yard space such as high-rise buildings and flats'* sourced from the ACT ES endorsed guideline ASC NEPM (2013).

However, it is recognised that there is currently insufficient information to give confidence that that this goal can be achieved. Therefore, this RAP also presents an interim remediation goal that is to make the 'AD' safe to allow for further assessment.

4.2 Remediation Hierarchy

The NSW DEC (2006) *'Guidelines for the NSW Site Auditor Scheme'*, which has been adopted for use in the ACT, provides a preferred hierarchy of options for site clean-up and / or management which is as follows:

- On-site treatment of contamination so that contamination is destroyed or the associated hazard is reduced to an acceptable level; or
- Off-site treatment of excavated soil, so that contamination is destroyed or reduced to an acceptable level, after which the soil is returned to site.

If the above management scenarios can not be delivered, the following options may be considered:

- Removal of the contaminated soil to an approved facility for disposal and where necessary, the disposed material is replaced with appropriate fill material; or
- Consolidation and isolation of the soil on site by containment with an appropriately designed barrier.

If remediation is likely to cause a greater adverse effect than would occur if left undisturbed, then remediation should not proceed. In cases where it may not be viable to remediate large quantities of soil with low levels of contamination, alternative remediation strategies may also be considered or developed.

4.3 Approach to Remedial Options

Based on the results of previous environmental assessments, ACM is expected to be primarily located in the upper three (3) metres (m) of building waste (note this measurement is referenced from the top of the stockpiles as assessed in 2007).

However, it is thought that the depth of impacted soil material is shallower toward the outer boundary of the dump. Therefore, the estimated volume of asbestos impacted soil has been based on a presumed depth of 2 m across the area of impact (0.45 ha) which equates to a total volume of 9,000 m³ or 14,400 tonne.

Therefore, assuming these estimates are generally correct the following is a brief summary of the expected remedial approach:

The removal of all asbestos materials, the impacted soil and an additional 300mm layer of soil below the dump should be sufficient to remediate the site. This material would then be replaced by soil assessed as suitable for the proposed land use from a contamination perspective ('HIL B' - high density residential), and reinstating the surface to its current level. Therefore at the completion of the remediation and reinstatement, the natural soil surface may be approximately 3.3 m below the surface at its deepest point.

To ensure any future construction works are undertaken within clean fill and minimise the risk of potential exposure of workers or the general public to remnant asbestos, Robson proposes the following remedial option:

- On completion of the removal of the 'AD' waste material remove an additional 300 mm strip (unimpacted soil) from across the impacted area. This material would be stockpiled and assessed to determine the appropriate reuse of this soil (if possible); and
- If contaminated material remains following the removal of the 300mm layer additional soil must be removed unless the remediation goal has been met in that the residual contamination can be successfully managed. For example, a geotextile marker barrier is placed on the excavated surface prior to the importation of clean fill to ensure the residual contamination is not disturbed in future.
- Note the use of a geotextile marker barrier would only be suitable if it could be guaranteed that no further excavation would be required in the affected area. This would certainly be the case if proposed redevelopment included, for example, a basement car park.

The above remedial procedure is generally acceptable however due to the inherent data gaps related to the vertical and horizontal extent of the contaminated waste it is prudent that prior to the implementation of bulk waste removal stage an ESA be undertaken to enhance the characterisation of the dump with regard to waste volumes and waste streams. This approach is expected to reduce the risks associated with the above remedial approach. Therefore, the remedial works will be undertaken in two (2) stages to allow an improved remedial outcome.

In summary, **Stage 1** of the remediation process would include:

- The removal and assessment of the vegetation cover for asbestos contamination;

- The removal of all visible surface asbestos materials and building waste(as needed);
- Undertake a Stage 1 Environmental Site Assessment (ESA) to delineate the dump; and
- Revise RAP based on findings of the ESA.

Based on the outcome of the ESA examples of possible remedial options for **Stage 2** works are given:

Option A: Disposal of waste to an ACT Licensed Landfill Facility

Option B: Disposal of waste to an approved containment cell.

The remedial option selected must be in accordance with the remediation hierarchy and in consideration of future land uses across the brickworks site and adjacent properties as highlighted in the NSW DEC (2006) '*Guidelines for the NSW Site Auditor Scheme*'.

In the event that on-site containment was considered to be a viable remediation strategy, this approach must meet all ACT environmental and planning regulatory requirements. Primarily, this would require an Environmental Management Plan (EMP) to be in place to ensure the contamination is appropriately managed by the responsible party (land owner) into the future.

With regards to asbestos materials and asbestos impacted fill soil, the purpose of the proposed staged remedial works is:

Stage 1

- Remove all vegetation and surface ACM under controlled conditions to allow for the implementation of the ESA. This stage of works is expected to involve the removal and stockpiling of vegetation and the subsequent removal and disposal of asbestos sheet materials and some asbestos impacted soil (when it becomes inefficient to remove single fragments of ACM by hand).
- Visually assess the haul route (within the work area) for ACM and issue a Clearance Certificate if no ACM is observed (validation sampling of the haul route within the work area following Stage 2 remedial works);
- Should reported spills of hydrocarbons or other contaminated material occur, visual or if olfactory indicators of contamination are present, then validation sampling of the impacted area would be undertaken to assess the suitability of the area for the proposed use; and
- Depending on the type and extent of contamination identified, the potential for groundwater impact must also be assessed.

Stage 2

- Based on the results of the ESA determine the appropriate remedial method;

- Identify and manage contaminated soil encountered during the remedial works which will be based on the outcomes of the ESA.
- On completion of bulk removal validate the base of the remedial excavation such that potential contaminant concentrations are below criteria applicable for the proposed land use;
- Visually assess and validate the haul routes within the work area for ACM and issue a Clearance Certificate if no ACM is observed or detected;
- Should reported spills of hydrocarbons or other contaminated material occur, visual or if olfactory indicators of contamination are present, then validation sampling of the impacted area would be undertaken to assess the suitability of the area for the proposed use;
- Ensure that a geotextile marker barrier is appropriately placed at the base of the remedial excavation (if required) and that the final thickness of imported fill (including the required topsoil layer) is at least 0.5 m;
- Ensure that the imported fill material is suitable (from an environmental point of view) for the proposed land use.

In summary the preferred method of remedial management of the 'AD' is to remove all visible ACM from the surface which may include the removal of some asbestos in soil materials. Following the ESA, data will be available to characterise the type and extent of the waste. This information will then be used to develop the most suitable remediation strategy in accordance with the NSW DEC (2006) '*Guidelines for the NSW Site Auditor Scheme*'. This highlights the importance that the remediation strategy is not only consistent with the remediation hierarchy but it is also consistent with the future land use of the Brickworks site as a whole and the current adjacent land use.

4.4 Presumed Extent of Remediation

The dump has been estimated to cover an area of 0.45 hectares and is known to be 3 m deep in some locations. However, it is thought that the depth of impacted soil material is shallower toward the outer boundary of the dump. Therefore, the estimated volume of asbestos impacted soil has been based on a presumed depth of 2 m across the area of impact (0.45 ha) which equates to a total volume of 9,000m³ or 14,400 tonne. The proposed area requiring excavation is shown on **Figure 2** and a cross section (Conceptual Site Model) is shown in **Figure 3**.

The extent of the required remediation is expected to be refined following the completion of the removal of vegetation and the surface ACM (Stage 1-3) through the implementation of the ESA.

4.5 Schedule for Remedial Works

An indicative schedule for the proposed soil remedial works on the site includes the following:

Table D. Schedule for Remedial Works

Task	Timing
Receipt of Development Approval	Unknown but expected by July 2014
RAP endorsement by the Auditor	Unknown but expected by July 2014
Site set up	5 days
Remove blackberry and other vegetation to enable access to surface waste.	3 days
Remove exposed ACM on ground surface by an ACT licensed asbestos removalist to improve the safety of the AD prior to the implementation of the ESA.	5 days
Undertake ESA to refine the characterisation of the AD.	5 days
ESA report and Audit Review	6 weeks
Based on the outcome of ESA revise the RAP and secure Auditors' endorsement	4 weeks

5 DATA QUALITY OBJECTIVES FOR SITE REMEDIATION

Assessment of the Data Quality Objectives (DQOs) is a process used to aid the planning of environmental investigations and remedial works by providing a structured methodology for assessing the environmental data collection processes, identification of sample locations, number of samples required, sampling techniques and defining acceptable assessment criteria.

The DQO process used to aid the development of this RAP has been prepared in general accordance with Appendix C of the Australian Standard AS4482.1-2005 '*Guide to the Investigation and Sampling of Sites with Potentially Contaminated Soil – Part 1: Non-Volatile and Semi-Volatile Compounds*' and the US EPA (2000) '*Data Quality Objectives Process for Hazardous Waste Site Investigation*' (US EPA QA/G-4HW).

The DQOs will be the long term goals and will not be achieved as part of the Stage 1 works.

5.1 Define the Study Boundaries

The remediation area applicable to this RAP is located within foot print of the 'AD' on the western boundary of the Brickworks. The site is identified as parts of Blocks 1, 20 Section 102 Yarralumla and part of Block 1 Section 127 Yarralumla. The boundary of the waste has not been surveyed but is shown generally in **Figure 2**. The combined area is approximately 0.45 ha.

The vertical boundary is estimated to be approximately 3.3 mbgl (at its deepest point); although this is to be confirmed by the ESA following the completion of Stage 1 remediation works.

Note: The extent of the required remediation is expected to be refined following the completion of the removal of vegetation and the surface ACM (Stage 1 - 3) through the implementation of an ESA.

5.2 State the Problem

Previous assessments on the site have identified asbestos containing materials in the building rubble within the dump and asbestos concentrations in soil (in the form of asbestos fibre) at levels which are unacceptable for the proposed land use. The encountered ACM was associated with building rubble in fill and therefore all fill material within the boundaries of the dump which contains building waste should, until demonstrated otherwise, be considered to be impacted with unacceptable levels of ACM.

As the dump is in an ephemeral drainage channel, off-site contamination of the surface soils down gradient is possible. Therefore, soils within the channel down gradient from site should be considered impacted with asbestos until demonstrated otherwise.



In addition to the asbestos, low concentrations of Total Petroleum Hydrocarbons (TPH) (110mg/kg TPH - C₂₉-C₃₆) was identified in the soil sample taken from a test pit location in June 2007. Therefore, awareness for the potential of other contaminants of concern must be maintained and may require further assessment or remediation to manage this risk.

Project Team and Communication Plan

The project team is known in part and will generally include the following entities:

- Representatives from the ACT Property Group who are the custodians of the site and the primary decision makers;
- The principal contractor is Capezio & Co P/L and they will be responsible for the set-up of the site for the remedial works (for example, site access, site amenity and sediment control measures);
- Remediation contractor to be confirmed, but they will be responsible for the provision of plant and operators to excavate the impacted soil, provide trucks for off-site haulage of impacted soil and undertake site reinstatement work;
- Contaminated land consultants from Robson, including a project manager and field staff who would provide on-site environmental consultancy advice during remedial works, including material tracking, collection of validation samples from remedial areas and soil stockpiles, and provision of an ACT Class 'A' asbestos assessor to validate remediated areas;
- An ACT licensed asbestos removalist to be confirmed, will set up decontamination zones and supervise the loading and removal works;
- A NSW EPA accredited site Auditor who will be responsible for the review of the works undertaken by the consultant and effectively represents the ACT EPA to ensure the suitability of the site for the proposed land use;
- The ACT EPA who would be responsible for reviewing applications for the removal of soil from the dump location and final review of the Site Audit Statement to be provided by the Auditor on completion.

A summary of the team members involved is presented in **Table E** below.

Table E: Project Team and Communication Plan

Organisation / Role	Name / Title	Contact Details	
		Phone	Email
TAMS (ACTPG)	Mike Brown Senior Manager	02 6231 0700	Mike.brown@act.gov.au

Organisation / Role	Name / Title	Contact Details	
		Phone	Email
	Katie Burrows Assistant Manager	02 6231 0700	Katie.burrows@act.gov.au
SSP Principal Representative for the Territory	Steve Hayden	02 6205 4651 0458 161 616	Steven.Hayden@act.gov.au
	Barry Ingham	02 62070037	barry.ingram@act.gov.au
	Michael Whitehouse	02 6205 3164	michael.whitehouse@act.gov.au
Capezio & Co P/L - Project Manager	Don Capezio Project Director	02 6239 1113	don@capezioandco.com.au
	Dylan Hughes Construction Manager	02 6239 1113	dylan@capezioandco.com.au
	Ben Da Pozzo Site Manager Admin	02 6239 1113	ben@capezioandco.au
GeoSyntec/ NSW EPA Accredited Auditor	Lange Jorstad - Auditor	0447 249 250	LJorstad@Geosyntec.com
Earthworks and Construction	TBA	TBA	TBA
Licensed Asbestos Removalist	TBA	TBA	TBA
ERM Heritage / Archaeological Consultant	Shelley James Principal Consultant	(02) 6253 6888 (02) 6253 6804	Shelley.james@erm.com
Robson Environmental Pty Ltd -	Ben Kendon - Project Manager	(02) 6171 4623	0437 008 278



Organisation / Role	Name / Title	Contact Details	
		Phone	Email
Environmental Consultant	Chris Gunton – Associate Environmental Scientist	(02) 6171 4619	0447 033 232
	Andrew Roberts – Site Manager	(02) 6171 4621	0437 009 369

Conceptual Site Model

Based upon the results of the previous assessments, it is assessed that all fill material within the footprint of the 'AD' which contains building waste should, until demonstrated otherwise, be considered to be impacted with unacceptable levels of ACM. It is estimated that the volume of fill containing builders waste is in the order of 9,000 m³ (in-situ, based upon an average depth of 2 m by the area of the dump (0.45 ha)) (refer **Figure 3**).

Note: The extent of the required remediation is expected to be refined following the completion of the removal of vegetation and the surface ACM (Stage 1 - 3) through the implementation of the ESA.

Future Exposure Scenarios

Potential receptors that may be exposed to contamination would include the following if remediation is not achieved:

- Construction and maintenance workers present during the construction works and ongoing maintenance of the site;
- Users / occupants of surrounding properties during the construction works and ongoing maintenance of the site;
- Future users and visitors to the site; and
- The potential for terrestrial organisms to be receptors is also considered and accounted for on the basis of the proposed site assessment criteria.

Potential exposure routes include via direct contact with contaminated soil, and by inhalation and / or ingestion of dust. Should contamination be migrating from the site, then neighbouring site users may be exposed to contaminants, particularly via inhalation and / or ingestion of dust.

5.3 Identify the Decision

Based on the previous assessments, it is understood that asbestos and low concentrations of hydrocarbon impacted soil and contaminants related to the septic system e.g. E.coli, is present on the site and that much of this material (potentially all) is to be bulk excavated and disposed of off-site or reused. Assuming that the proposed soil remedial works are undertaken, the principal study questions are:

- *"Does the soil on the site contain contaminant concentrations and / or other indicators of potential contamination that may pose an unacceptable risk to human health and / or the environment, thereby affecting the suitability of the site for the proposed potential residential land use ('HIL B' – High density residential)?"*
- *If the answer to the above is in the affirmative then "Have appropriate management measures been put in place to isolate the contamination so that it cannot be readily disturbed and cannot generate airborne asbestos fibres or other contaminant releases".*

5.4 Identify Inputs to the Decision

A variety of data inputs have been identified to allow an informed and measured decision regarding the development of the RAP. The inputs required are summarised in **Table F** below.

Table F: Identified Data Inputs for the RAP

Data Input	Adequacy of Information
Historical Land Use	<p>Adequate – Information is presented in the previous reports by Robson, particularly:</p> <ul style="list-style-type: none"> • Connell and Wagner 2001 - <i>Appendix F-Brickworks Contamination Report</i> • Robson Laboratories Pty Ltd (October 2006) '<i>Environmental Investigation – Audit Report Yarralumla Brickworks Block 1 Section 102 Yarralumla Canberra Central ACT</i>' (Robson reference 3144_CL_EI Final_20061018). • Robson Laboratories Pty Ltd (2007) '<i>Remediation Action Plan - Asbestos Dump Yarralumla Brickworks Block 1 Section 102 Yarralumla Canberra Central ACT</i>' (Robson reference 3144_CL_RAP_20070612).
Identification of Areas Requiring Remediation	<p>Inadequate – The areas to be remediated include asbestos sheet materials and the associated impacted soil (fill containing building rubble) and the potential for hydrocarbons which has not been delineated laterally or vertically.</p> <p>This is to be confirmed through an ESA to be undertaken following the completion of the removal of the vegetation and the surface ACM.</p>
Identification of Contaminants	<p>Generally Adequate – Appropriate contaminants of concern are defined in the previous Robson assessment reports. Specifically this includes asbestos, hydrocarbons and contaminants related to the septic system e.g. E. coli.</p> <p>This is to be confirmed through an ESA to be undertaken following the completion of the removal of the vegetation and the surface ACM.</p>
Quantification of Contaminants in Soil	<p>Generally Adequate – The concentrations of asbestos in soil have been broadly assessed, with all fill material containing building rubble assumed to be asbestos impacted. The lateral and vertical extent of the hydrocarbons and other potential contaminants of concern to be assessed during the ESA.</p> <p>This is to be confirmed through an ESA to be undertaken following the completion of the removal of the vegetation and the surface ACM.</p>

5.5 Develop a Decision Rule

5.5.1 Assessment Criteria for Soil

Investigation and screening level criteria as defined in the ASC NEPM (2013) are the concentrations of contaminants above which further assessment and/or appropriate remediation may be required.

Robson understands that the site is to be redeveloped for mixed-use high density residential land use. The assessment criteria applicable to this exposure scenario and sourced from the ASC NEPM (2013) are the Health-based Investigation Level (HIL) 'B'- *'Residential with minimal opportunities for soil access including dwellings with fully and permanently paved yard space such as high-rise buildings and flats'*.

The NEPM also provides health screening levels (HSLs) for petroleum hydrocarbon compounds. It is considered that the dominant exposure pathway to petroleum hydrocarbon compounds would likely be via vapour inhalation, and therefore criteria sourced from Table 1A (3) have been adopted for the purpose of screening during this assessment.

In addition to the above, the NEPM also provides ecological investigation levels (EILs) for common contaminants (including arsenic, copper, chromium (III), DDT, naphthalene, nickel, lead and zinc), and ecological screening levels (ESLs) for petroleum hydrocarbons (including benzene, toluene, ethylbenzene and xylene (BTEX), benzo(a)pyrene (B(a)P), and total recoverable hydrocarbon (TRH) fractions. The EILs and ESL should generally be applied to contaminants in the top two (2) metres (m) of soil at the finished surface / ground level for generic land use settings, which corresponds to the root zone and habitation zone of many plant species.

A summary of the proposed soil assessment criteria for the site are presented overleaf in **Table G and H**.

Based on the field observations (which are presented in **Section 3**) the soil sampled from the bore holes east of the dump and from the test pits within the dump were classified as silty clay.

To assess the suitability of the soil in the vicinity of the dump, the HSL criteria for clay has been applied while the suitability of the soil with regards to ecological considerations has been assessed against the ESL criteria for fine soil texture (The soil type will be reassessed during the Stage 1 ESA and the assessment criteria will be adjusted accordingly). In addition, the dump excavation is expected to be excavated from the surface to a depth of approximately 3 m below ground level (bgl) in some locations which extends over three (3) HSL depth categories (0 m to less than (<) 1 m, 1 m to < 2 m and 2 m to < 4 m). For the purpose of this assessment, the depth applied to establish the HSL criteria was 0 m to < 1 m which is considered appropriate as there is a high likelihood that soil will occur within this depth range and this will permit future occupants to be within close proximity to the soil surface without risk of exposure.

Following the assessment of TRH (fractions F1 – F4) impacts with consideration given to the ESL and HSLs, the TRH Management Limits must also be considered and these have been sourced from Table 1(B)7 'Management Limits for TRH Fractions F1 – F4 in Soil' of the ASC NEPM (2013). As the proposed land use includes a residential component, the residential, parkland and open space category with a 'fine' soil texture has been used to determine the TRH Management Limits criteria.

A summary of the adopted HILs and HSLs for the 'AD' assessment are presented below in Table G, and the adopted EILs and ESLs are summarised in the following Table H below.

Table G: Proposed Soil Assessment Criteria (HILs and HSLs)

Contaminant	HIL B ¹ (mg/kg)	HSL B ² (Clay) (mg/kg)
ACM	0.04 % w/w	NE
Fibrous Asbestos (FA)	0.001 % w/w	NE
Asbestos Fines (AF)	0.001 % w/w	NE
Benzene	NE	0.7
Ethylbenzene	NE	NL
Toluene	NE	480
Xylene (m & p)	NE	NE
Xylene (o)	NE	NE
Xylene Total	NE	110
F1 (TPH C ₆ – C ₁₀ minus BTEX)	NE	50
F2 (TPH greater than (>) C ₁₀ - C ₁₆ minus naphthalene)	NE	280
Carcinogenic PAHs (as B(a)P TEQ)	4	NE
Napthalene	NE	5
PAHs (Sum of total)	400	NE
Total Phenols	45,000	NE
DDT+DDE+DDD	600	NE
Aldrin and dieldrin	10	NE
Chlordane	90	NE
Endosulfan	400	NE
Endrin	20	NE
HCB	15	NE
Heptachlor	10	NE
Methoxychlor	500	NE
Mirex	20	NE
Toxaphene	30	NE
PCBs (Sum of total)	1	NE
Arsenic (total)	500	NE
Cadmium	20	NE
Chromium (VI)	500	NE
Copper	30,000	NE
Lead	1,200	NE
Mercury (inorganic)	120	NE

Contaminant	HIL B ¹ (mg/kg)	HSL B ² (Clay) (mg/kg)
Nickel	1200	NE
Zinc	60,000	NE

Notes:

1. ASC NEPM (2013) – Table 1A(1) 'Health investigation levels for soil contaminants' of Schedule B1 'Guideline on Investigation Levels for Soil and Groundwater', HIL B Exposure Setting: 'Residential with minimal opportunities for soil access including dwellings with fully and permanently paved yard space such as high-rise buildings and flats'.
2. ASC NEPM (2013) – Table 1A (3) 'Soil HSLs for vapour intrusion' of Schedule B1 'Guideline on Investigation Levels for Soil and Groundwater', HSL A & HSL B Exposure Setting: Low to high density residential. Adopted value is for a clay soil at a depth of 0 m to < 1 m.
NE = Not established, mg/kg = milligrams per kilogram, TEQ = toxicity equivalent quotient, PAH = Polycyclic Aromatic Hydrocarbons

Table H: Proposed Soil Assessment Criteria (EILs and ESLs)

Contaminant	EIL ¹ (mg/kg)	ESL ² (Fine) (mg/kg)
Benzene	NE	65
Ethylbenzene	NE	125
Toluene	NE	105
Xylene (m & p)	NE	NE
Xylene (o)	NE	NE
Xylene Total	NE	45
F1 (TPH C ₆ – C ₁₀ minus BTEX)	NE	180 (800 ⁴)
F2 (TPH greater than (>) C ₁₀ - C ₁₆ minus naphthalene)	NE	120 (1,000 ⁴)
F3 (TPH > C ₁₆ - C ₃₄)	NE	1,300 (3,500 ⁴)
F4 (TPH > C ₃₄ - C ₄₀)	NE	5,600 (10,000 ⁴)
Carcinogenic PAHs (as B(a)P TEQ)	NE	0.7
Napthalene	170	NE
PAHs (Sum of total)	NE	NE
Total Phenols	NE	NE
DDT	180	NE
Aldrin and dieldrin	NE	NE
Chlordane	NE	NE
Endosulfan	NE	NE
Endrin	NE	NE
HCB	NE	NE
Heptachlor	NE	NE
Methoxychlor	NE	NE
Mirex	NE	NE
Toxaphene	NE	NE
PCBs (Sum of total)	NE	NE

Contaminant	EIL ¹ (mg/kg)	ESL ² (Fine) (mg/kg)
Arsenic (total)	100	NE
Cadmium	NE	NE
Chromium (III)	190 – 400 (TBD)	NE
Copper	6 – 230 (TBD)	NE
Lead	1,100	NE
Mercury (inorganic)	NE	NE
Nickel	30 – 560 (TBD)	NE
Zinc	70 – 1300 (TBD)	NE

Notes:

1. ASC NEPM (2013) – Table 1B (5) '*Generic EILs for aged As, Pb, fresh DDT and fresh naphthalene in soil irrespective of their physicochemical properties*'.
2. ASC NEPM (2013) – Table 1B(6) '*ESLs for TPH fractions F1 – F4, BTEX and Benzo(a)Pyrene in soil*' of Schedule B1 '*Guideline on Investigation Levels for Soil and Groundwater*', ESL setting urban residential and public open space.
3. ASC NEPM (2013) – ASC NEPM Toolbox, '*Ecological Investigation Levels – Interactive (Excel) Calculation Spreadsheet*'. Assuming the heavy metals are aged, that is, greater than two (2) years old. Soil physiochemical properties required to calculate EILs for Cu, Ni, CrIII and Zn (refer TBD below).
4. ASC NEPM (2013) Table 1B(7) '*Management Limits for TPH fractions F1-F4 in soils*'; Soil texture 'fine', residential, parkland and open public space exposure setting.

NE: Not established, mg/kg = milligrams per kilogram.

TBD: To be determined at time of the environmental investigation due lack of chemical data required to calculate site specific EILs.

The standard laboratory analysis for chromium provides a total concentration (that is, the result is unspicated for chromium (III) and chromium (VI)). As the HIL 'B' assessment criteria for chromium (VI) is 500 mg/kg, it was considered that should the measured concentration of total chromium exceed this, then the sample would be re-analysed and speciated to measure the chromium (VI) concentration.

Statistical Evaluation

Statistical evaluation of soil analytical results may be necessary in the event of exceedences of the adopted assessment criteria. Statistical analysis should adhere to the following criteria:

- No single analytical result is to be greater than 250 % of the site criterion;
- The arithmetic mean of sample analytical results must be below the site criterion;
- The standard deviation must be less than 50 % of the site criterion.

In addition, NSW EPA (1995) '*Sampling Design Guidelines*' indicates that a site or sampling area cannot be considered to be uncontaminated or successfully remediated if the 95 % Upper Confidence Limit (UCL) of the arithmetic average concentration exceeds the assessment criterion. Therefore to achieve Site validation the 95 % UCL must be used as a tool to establish the efficacy of remedial works.



Evaluation of Soil Assessment Criteria

Envirolab Pty Ltd (Envirolab) is the proposed primary laboratory, while SGS Services Pty Ltd (SGS) is the proposed secondary laboratory. Both laboratories are NATA endorsed for the proposed analytical suite.

The limits of laboratory reporting (LOR) for the analytical methods used by the primary laboratory were compared with the proposed assessment criteria. This was to ensure that the assessment criteria values exceeded the laboratory LOR. The results of the comparison are presented overleaf in **Tables I and J**.

Table I. Comparison of the Laboratory LOR with the Proposed Soil Assessment Criteria (HILs and HSLs)

Contaminant	HIL A ¹ (mg/kg)	HSL B ² (Clay) (mg/kg)	Laboratory LOR (mg/kg)
Asbestos			
ACM	0.04 % w/w	NE	0.1 g/kg (0.01 % w/w)
Fibrous Asbestos (FA)	0.001 % w/w	NE	0.1 g/kg (0.01 % w/w)
Asbestos Fines (AF)	0.001 % w/w	NE	0.1 g/kg (0.01 % w/w)
Hydrocarbons			
Benzene	NE	0.7	0.2
Ethylbenzene	NE	NL	1
Toluene	NE	480	0.5
Xylene (m & p)	NE	NE	2
Xylene (o)	NE	NE	1
Xylene Total	NE	110	3
F1 (TPH C ₆ – C ₁₀ minus BTEX)	NE	50	25
F2 (TPH greater than (>) C ₁₀ - C ₁₆ minus naphthalene)	NE	280	50
Polycyclic Aromatic Hydrocarbons (PAHs)			
Carcinogenic PAHs (as B(a)P TEQ)	3	NE	0.05
Napthalene	NE	5	0.1
PAHs (Sum of total)	300	NE	1.55
Total Phenols	3000	NE	0.2
Organochlorine Pesticides			
DDT+DDE+DDD	240	NE	0.3
Aldrin and dieldrin	6	NE	0.2
Chlordane	50	NE	0.1
Endosulfan	270	NE	0.1
Endrin	10	NE	0.1
HCB	10	NE	0.1
Heptachlor	6	NE	0.1
Methoxychlor	300	NE	0.1
Mirex	10	NE	0.5
Toxaphene	20	NE	NA
PCBs (Sum of total)	1	NE	0.7
Metals			
Arsenic (total)	500	NE	4
Cadmium	20	NE	0.4
Chromium (VI)	500	NE	1
Copper	30,000	NE	1
Lead	1,200	NE	1
Mercury (inorganic)	120	NE	0.1
Nickel	1200	NE	1
Zinc	60,000	NE	1

Notes:
Bold: LOR is greater than the assessment criteria.

Table J. Comparison of the Laboratory LOR with the Proposed Soil Assessment Criteria (EILs and ESLs)

Contaminant	EIL ¹ (mg/kg)	ESL ² (Fine) (mg/kg)	Laboratory LOR (mg/kg)
Hydrocarbons			
Benzene	NE	65	0.2
Ethylbenzene	NE	125	1
Toluene	NE	105	0.5
Xylene (m & p)	NE	NE	2
Xylene (o)	NE	NE	1
Xylene Total	NE	45	3
F1 (TPH C ₆ – C ₁₀ minus BTEX)	NE	180	25
F2 (TPH greater than (>) C ₁₀ - C ₁₆ minus naphthalene)	NE	120	50
F3 (TPH > C ₁₆ - C ₃₄)	NE	1300	100
F4 (TPH > C ₃₄ - C ₄₀)	NE	5600	100
Polycyclic Aromatic Hydrocarbons (PAHs)			
Carcinogenic PAHs (as B(a)P TEQ)	NE	0.7	0.05
Napthalene	170	NE	0.1
PAHs (Sum of total)	NE	NE	1.55
Total Phenols	NE	NE	0.2
Organochlorine Pesticides			
DDT	180	NE	0.3
Aldrin and dieldrin	NE	NE	0.2
Chlordane	NE	NE	0.1
Endosulfan	NE	NE	0.1
Endrin	NE	NE	0.1
HCB	NE	NE	0.1
Heptachlor	NE	NE	0.1
Methoxychlor	NE	NE	0.1
Mirex	NE	NE	0.5
Toxaphene	NE	NE	NA
PCBs (Sum of total)	NE	NE	0.7
Metals			
Arsenic (total)	100	NE	4
Cadmium	NE	NE	0.4
Chromium (III)	190 – 400 (TBD)	NE	1
Copper	6 – 230 (TBD)	NE	1
Lead	1,100	NE	1
Mercury (inorganic)	NE	NE	0.1
Nickel	30 – 560 (TBD)	NE	1
Zinc	70 – 1300 (TBD)	NE	1

Notes:

Bold: LOR is greater than the assessment criteria.

With regards to the asbestos criteria and laboratory LORs, it is noted from the Australian Standard AS4964-2004 '*Method for the Qualitative Identification of Asbestos in Bulk Samples*', which is a NATA accredited method for qualitative identification of asbestos in bulk samples, that the limit of reporting (LOR) of asbestos by the laboratory is 0.1 g/kg, which is equivalent to 0.01 % weight per weight (% w/w). That is, the assessment criteria for FA and AF are therefore below the laboratory LOR. Other analytical methods for the detection of asbestos which can achieve the required FA and AF criteria are not NATA accredited methods but should be considered appropriate if required.

In the interim it is noted that the laboratories used do report in their comments section of the analytical report whether asbestos was detected but at concentrations below the LOR. If such a comment is made a precautionary approach will be adopted and the sample will be considered to exceed the assessment criteria. On the other hand, if the result is reported as being below the LOR and no additional comment is provided then the sample result will be considered to be below the assessment criteria.

Based on the review, the laboratory LOR for each analyte are considered suitable for the purpose of this RAP.

5.5.2 Classification of Excess Soil for Off-Site Beneficial Re-Use

The material to be excavated from the site which does not present indicators of contamination and is surplus to the requirements for the proposed site redevelopment will be assessed for suitability either for on-site use or for BRU on other properties within the ACT (most likely day cover at the West Belconnen Resource Management Centre (WBRMC) or commercial / industrial properties). Should material be considered unsuitable for off-site BRU then it would be assessed for off-site disposal to a licensed waste facility or to an approved containment cell.

The criteria considered to be applicable for the assessment of the material for BRU on commercial / industrial properties are the NEPM HIL 'D' which includes premises such as shops and offices as well as factories and industrial sites. HSL 'D' and ESL 'Fine' would be applied to assess hydrocarbon impacts when required. The proposed soil criteria for assessment for off-site BRU are summarised below in **Tables K and L**.

Table K: Proposed Assessment Criteria for Off-Site Beneficial Re-Use (HIL and HSL)

Contaminant	HIL D ¹ (mg/kg)	HSL D ² (Clay) (mg/kg)	WA Guideline ² (% w/w)
ACM	NE	NE	0.05
Fibrous Asbestos (FA)	NE	NE	0.001
Asbestos Fines (AF)	NE	NE	0.001
Benzene	NE	4	NA
Ethylbenzene	NE	NE	NA
Toluene	NE	NE	NA
Xylene (m & p)	NE	NE	NA
Xylene (o)	NE	NE	NA
Xylene Total	NE	230	NA
F1 (TPH C ₆ - C ₁₀ minus BTEX)	NE	310	NA
F2 (TPH greater than (>) C ₁₀ - C ₁₆ minus naphthalene)	NE	NE	NA
Carcinogenic PAHs (as B(a)P TEQ)	40	NE	NA
Napthalene	NE	5	NA
PAHs (Sum of total)	4000	NE	NA
Total Phenols	240000	NE	NA
DDT+DDE+DDD	3600	NE	NA
Aldrin and dieldrin	45	NE	NA
Chlordane	530	NE	NA
Endosulfan	2000	NE	NA
Endrin	100	NE	NA
HCB	80	NE	NA
Heptachlor	50	NE	NA
Methoxychlor	2500	NE	NA
Mirex	100	NE	NA
Toxaphene	150	NE	NA
PCBs (Sum of total)	7	NE	NA
Arsenic (total)	3000	NE	NA
Cadmium	900	NE	NA
Chromium (VI)	3600	NE	NA
Copper	240000	NE	NA
Lead	1500	NE	NA
Mercury (inorganic)	730	NE	NA
Nickel	6000	NE	NA
Zinc	400000	NE	NA

Notes:

1. NEPM (1999, amended 2013) – Table 1A(1) 'Health investigation levels for soil contaminants' of Schedule B1 'Guideline on Investigation Levels for Soil and Groundwater', HIL D commercial/industrial such as shops, offices, factories and industrial sites
2. NEPM (1999, amended 2013) – Table 1A(3) 'Soil HSLs for vapour intrusion' of Schedule B1 'Guideline on Investigation Levels for Soil and Groundwater', HSL D Exposure Setting: Commercial and Industrial. Adopted value is for a clay soil at a depth of 0 m to < 1 m.
NE = Not established; NA = Not Applicable; mg/kg = milligrams per kilogram; TEQ = toxicity equivalent quotient;
PAH = Polycyclic Aromatic Hydrocarbons

Table L: Proposed Assessment Criteria for Off-Site Beneficial Re-Use (EIL and ESL)

Contaminant	EIL ¹ (mg/kg)	ESL ² (Fine) (mg/kg)
Benzene	NE	95
Ethylbenzene	NE	185
Toluene	NE	135
Xylene (m & p)	NE	NE
Xylene (o)	NE	NE
Xylene Total	NE	95
F1 (TPH C ₆ - C ₁₀ minus BTEX)	NE	215
F2 (TPH greater than (>) C ₁₀ - C ₁₆ minus naphthalene)	NE	170
F3 (TPH > C ₁₆ - C ₃₄)	NE	2500
F4 (TPH > C ₃₄ - C ₄₀)	NE	6600
Carcinogenic PAHs (as B(a)P TEQ)	NE	0.7
Napthalene	370	NE
PAHs (Sum of total)	NE	NE
Total Phenols	NE	NE
DDT	640	NE
Aldrin and dieldrin	NE	NE
Chlordane	NE	NE
Endosulfan	NE	NE
Endrin	NE	NE
HCB	NE	NE
Heptachlor	NE	NE
Methoxychlor	NE	NE
Mirex	NE	NE
Toxaphene	NE	NE
PCBs (Sum of total)	NE	NE
Arsenic (total)	160	NE
Cadmium	NE	NE
Chromium (III)	190 – 400 (TBD)	NE
Copper	6 – 230 (TBD)	NE
Lead	1800	NE
Mercury (inorganic)	NE	NE
Nickel	30 – 560 (TBD)	NE
Zinc	70 – 1300 (TBD)	NE

Notes:

1. NEPM (1999, amended 2013) – Table 1B (5) 'Generic EILs for aged As, Pb, fresh DDT and fresh naphthalene in soil irrespective of their physicochemical properties'.
2. NEPM (1999, amended 2013) – Table 1B (6) 'ESLs for TPH fractions F1 – F4, BTEX and Benzo(a)Pyrene in soil' of Schedule B1 'Guideline on Investigation Levels for Soil and Groundwater', ESL setting commercial and industrial.
3. NEPM (1999, amended 2013) – ASC NEPM Toolbox, 'Ecological Investigation Levels – Interactive (Excel) Calculation Spreadsheet'. Assuming the heavy metals are aged, that is, greater than two (2) years old. Soil physiochemical properties required to calculate EILs for CrIII, Cu, Ni, and Zn (refer TBD below).

NE: Not established, mg/kg = milligrams per kilogram.

TBD: To be determined at time of the environmental investigation due lack of chemical data required to calculate site specific EILs.

5.5.3 Classification of Waste Soil for Off-Site Disposal

Soil material that is considered to be unsuitable for off-site BRU and which requires disposal off-site at a licensed waste facility in the ACT would be assessed against applicable criteria presented in Environment ACT (2000) 'ACT's Environmental Standards: Assessment & Classification of Liquid & Non-liquid Waste', a summary of which is provided below in **Table M**. It is also noted that soil potentially impacted with asbestos is to be classified as an 'asbestos contaminated waste' in accordance with ACT EPA Contaminated Sites Information Sheet No. 5 (2011) 'Requirements for the Transport and Disposal of Asbestos Contaminated Wastes'.

Table M: Soil Waste Assessment Criteria

Contaminant	Waste Classification (Environment ACT Table A3) ¹ (mg/kg)		
	Inert	Solid	Industrial
Hydrocarbons (BTEX and TPH)			
Benzene	1	10	40
Ethylbenzene	60	600	2400
Toluene	28	288	1152
Xylene (m & p)	NE	NE	NE
Xylene (o)	NE	NE	NE
Xylene Total	100	1000	4000
TPH (C ₆ – C ₁₀)	650	650	2600
TPH (C ₁₀ – C ₄₀)	5000	10000	40000
Polycyclic Aromatic Hydrocarbons (PAHs)			
Naphthalene	NE	NE	NE
Carcinogenic PAHs (as B(a)P TEQ)	0.08	0.8	3.2
PAHs (Sum of total)	200	200	800
Total Phenolics			
Total Phenols	28	288	1152
Organochlorine Pesticides			
DDT	NE	NE	NE
Aldrin and dieldrin	NE	NE	NE
Chlordane	NE	NE	NE
Endosulfan	NE	NE	NE
Endrin	NE	NE	NE
HCB	NE	NE	NE
Heptachlor	NE	NE	NE
Methoxychlor	NE	NE	NE
Mirex	NE	NE	NE
Toxaphene	NE	NE	NE

Contaminant	Waste Classification (Environment ACT Table A3) ¹ (mg/kg)		
	Inert	Solid	Industrial
Polychlorinated Biphenyls			
PCBs (Sum of total)	2	<50	<50
Metals			
Arsenic	10	100	400
Cadmium	2	20	80
Chromium (III)	NE	NE	NE
Chromium (VI)	10	100	400
Copper	NE	NE	NE
Lead	10	100	400
Mercury (inorganic)	0.4	4	16
Nickel	4	40	160
Zinc	NE	NE	NE

Notes:

NE: Not established

¹ CT: Contaminant Threshold values for waste classification without doing the leachate test.

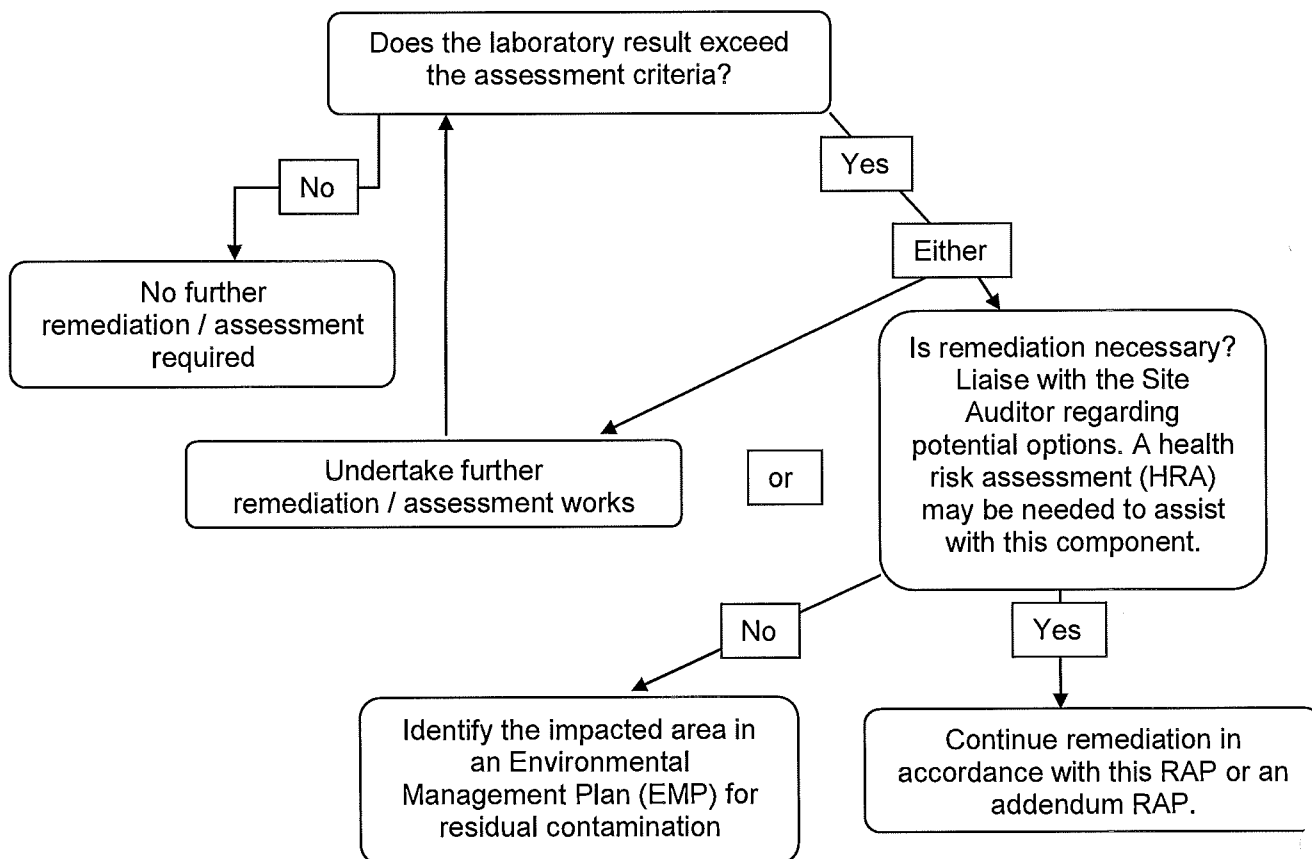
With regards to the above, it is noted that if exceedences of the Solid Waste Classification criteria are recorded, then additional laboratory analysis to determine the leachability of samples (using the Toxicity Characteristic Leaching Procedure (TCLP)) may be undertaken, with the results then being compared against criteria sourced from Table A4 of Environment ACT (2000) 'ACT's *Environmental Standards: Assessment & Classification of Liquid & Non-liquid Waste*'.

5.5.4 Airborne Fibre Monitoring Criteria

The control level for airborne fibre concentrations recorded during air monitoring will be 0.01 fibres/mL, as required by National Occupational Health and Safety Commission (NOHSC): 2002 (2005) '*Safe Removal of Asbestos, 2nd Edition*'. It is further noted that 0.01 fibres/mL represents a concentration that is 1/10th of the WorkSafe Australia's recommended Exposure Standard for all forms of asbestos of 0.1 fibres/mL, as documented in the guideline NOHSC:1003 (1995, amended 2003) '*Adopted National Exposure Standards for Atmospheric Contaminants in the Occupational Environment*'.

5.6 Develop a Decision Rule

Should soil concentrations in validation samples be recorded at levels which exceed the adopted assessment criteria, then the significance of the exceedences and appropriate course of actions would be assessed in liaison with the Site Auditor and then discussed within the validation report. The decision rule for the comparison of laboratory results with the assessment criteria is presented in the following flow chart.



A long term Environmental Management Plan may be required for the future of the site if it is found to be acceptable to leave residual impacts within the site boundary.

The purpose of the EMP will be to identify the contaminant risks associated with the site, especially in relation to asbestos sheet fragments that may be present below 3 m (in some locations) and inform personnel who may be exposed to remnant asbestos of the risks and the required precautions for undertaking works on the site. Further information regarding the requirements of the EMP is presented in **Section 6.2**.

5.7 Specify Tolerable Limits on Decision Errors

Two (2) primary decision errors may occur which would affect the outcome of the assessment of the suitability of the site for the proposed land use. The errors and their associated consequences are presented in **Table N** overleaf.

Table N: Identified Decision Errors and Associated Consequences for the Site

Error	Consequences
The site is assessed as suitable for the proposed residential use when it is actually unsuitable.	Contamination remains on site that may pose a risk to human health and / or the environment.
The site is assessed as unsuitable for the proposed residential use when the site is actually suitable.	Financial consequences associated with unnecessary assessment and / or remedial works.

The consequence of assessing the site as suitable when it is in fact unsuitable is considered to be more significant than the consequence of assessing the site as unsuitable.

Similar, there are also two (2) primary decision errors which may occur which would affect the outcome of the assessment of the suitability of the material proposed to be bulk excavated and beneficially re-used and / or disposed of off-site. The errors and their associated consequences are presented in **Table O** below.

Table O: Identified Decision Errors and Associated Consequences for Off-Site Beneficial Re-Use and / or Waste Disposal

Error	Consequences
The material to be bulk excavated (or part thereof) is assessed as being suitable for BRU and / or disposal when it is actually unsuitable.	Contamination is transported to the recipient site and may pose a risk to human health and / or the environment.
The material to be bulk excavated (or part thereof) is assessed as being unsuitable for BRU and / or disposal when it is actually suitable.	Financial consequences associated with unnecessary remediation and associated management.

Factors that may contribute to the above decision errors include:

- Sampling design errors – may be attributed to too few sample locations, high variability of the contaminant dispersion or volatile loss due to the disturbed nature of the sample;
- Measurement errors – may be attributed to poor sampling methods, sample collection techniques, poor sample handling, poor sample preparation or analytical errors;
- Interpretive error – data is interpreted incorrectly.

The strategy to minimise the risk of a decision error from occurring is presented overleaf in **Table P**.

Table P: Strategy for Minimising the Risk of a Decision Error from Occurring.

Factor Contributing to Error	Type of Error	Actions to Minimise Risk of Occurring
Sample Design Error	Insufficient Sampling	Validation sampling to be conducted in general accordance with the WA Guidelines and NSW EPA (1995) 'Sampling Design Guidelines'.
	Contaminant Variability	Appropriate number of duplicate / triplicate samples to be collected in accordance with AS4482.1-2005. Samples will be representative of the variability within the sample media (e.g. a stockpile).
Measurement Errors	Inappropriate Sample Methods	Selection of appropriate sample method to allow sampling of the required locations.
	Sample Collection Techniques	Sampling to be completed in accordance with Robson Standard Operating Procedures (SOP) 'Soil Sampling and Logging' (EAR-SOP003).
	Volatile Loss	Soil samples will be immediately placed into clean laboratory supplied glass jars, sealed with teflon-lined lids and stored in an ice cooled container.
	Poor Sample Handling	Samples to be stored and transported in ice cooled eskies under Chain of Custody (COC) conditions.
	Poor sample preparation and analytical error	Field quality assurance / quality control (QA / QC) duplicates, triplicates, rinsates, trip blanks and trip spikes to be collected in accordance with AS4482.1-2005 to assess reproducibility of sample results, decontamination procedures and potential volatile loss during transport. Laboratory QA / QC to be reviewed to assess laboratory quality.
Misidentification of ACM	Incorrect identification of contaminant	A licensed ACT Class 'A' Asbestos Assessor will be responsible for providing clearance of the site to ensure that there is no visible ACM or asbestos fibre at the surface of the remedial excavations prior to the reinstatement of clean soil.

Factor Contributing to Error	Type of Error	Actions to Minimise Risk of Occurring
	Removal of uncontaminated material	A licensed ACT Class 'A' Asbestos Assessor will be present on site to assess that the material known to contain ACM is removed from the site.
Interpretive Error	Incorrect interpretation leading to error	All reports and correspondence to be peer reviewed within Robson and final report to be reviewed by third party NSW EPA accredited Site Auditor.

Duplicate samples will be used to assess the reproducibility of the sampling and analytical methods used. Calculation of the Relative Percentage Difference (RPD) is a method of normalising two (2) values, and allows a comparison between values and represents the difference between the primary and QC sample, divided by the average of the two results expressed as a percentage.

The RPD is calculated with the formula provided below.

$$\text{RPD} = \frac{\text{Result No. 1} - \text{Result No.2}}{\text{Mean Result}} \times 100$$

Calculated RPD results would be considered acceptable when the value is less than 50 %. Should the RPD value exceed 50 %, then further investigation to the cause of the difference between the primary and QC results would be undertaken.

For example, RPD analysis produces higher results with low value numbers. Therefore, values above 50% can occur and the cause may not be reflective of laboratory or validation data quality.

The tolerances for the evaluation of the internal laboratory quality control samples are based on the laboratory's acceptance criteria. The tolerances for the laboratory quality control samples are summarised below in **Table Q**.

Table Q: Limits for the Assessment of Internal Laboratory Quality Control Samples

Sample Type	Acceptable Limits
Surrogate Spikes	60% - 140%
Duplicate Sample	0% - 50% (if result is 5 times greater than the LOR)
Matrix Spikes	70% - 130% (metals)
Method Blanks	Less than the LOR

Should the results of the internal laboratory QA / QC exceed the acceptable limits, then investigation of the laboratory methods would be undertaken to assess whether the reliability of laboratory results is compromised and how the laboratory results may affect the decision making process outcomes of the assessment.

5.8 Optimise the Design for Obtaining Data

The following sections outline the proposed strategy for the ESA following the completion of Stage 1 (removal of vegetation and surface ACM), the sampling to assess the environmental condition of stockpiled material (when relevant) and the validation sampling to assess the effectiveness of the remediation works.

5.8.1 Removal of Impacted Soil

The dump has been estimated to cover an area of 0.45 hectares and is known to be 3 m deep in some locations. However, it is thought that the depth of impacted soil material is shallower toward the outer boundary of the dump. Therefore, the estimated volume of asbestos impacted soil has been based on a presumed depth of 2 m across the area of impact (0.45 ha) which equates to a total volume of 9,000 m³ or 14,400 tonne.

Due to the uncertainty related to the extent, volume and concentrations of contaminants within the waste, the removal of the impacted soil will be achieved in two (2) stages.

Stage 1

The objective of the proposed Stage 1 remedial works is to remove all surface vegetation excluding the large trees followed by the removal of surface ACM. An ESA would then be undertaken to improve the characterisation of the 'AD'. A detailed discussion regarding the proposed sample and analytical program is provided in **Section 6.7**. Also refer to **Figure 4** for the remedial works lay out plan and **Figure 5** for the proposed ESA sample location plan.

Stage 2

The objective of the proposed Stage 2 remedial works is to remove the remainder of the identified waste from Stage 1 works. Based on the current information it is expected to remove an average 2 m thick layer from across the site. Validation of the underlying remnant soil would then be undertaken in accordance with the ASC NEPM (2013). A detailed discussion regarding the proposed excavation validation program is provided in **Section 6.8**. Also refer to **Figure 6** for the remedial works lay out plan.

Assessment of Excavated Soil for Off-site BRU / Waste Disposal

As the material to be excavated from the site is expected to be unsuitable (from an environmental perspective) for the proposed residential land use, it is therefore proposed that excavated soil be assessed for suitability for BRU on other properties within the ACT (most likely commercial / industrial properties). The suitability of the material for such purposes would be assessed against the ASC NEPM (2013). This

may be achieved in-situ during the Stage 1 ESA or may need to be assessed once the material has been placed in distinct stockpiles if it can be determined by visual assessment that materials are unlikely to be contaminated.

Note: to achieve Waste or BRU classification from an in-situ assessment, the intent must be made clear to the ACT ESDD (now ACT Environmental Standards (ES)) prior to undertaking the assessment.

Material that is considered to be unsuitable for off-site BRU would then be assessed against the Environment ACT (2000) '*ACT's Environmental Standards: Assessment & Classification of Liquid & Non-liquid Wastes*' to classify the soil for off-site disposal to a licensed waste facility or for containment.

Detailed discussion regarding the assessment of stockpiled material is provided in **Section 6.7**.

Assessment of Suitability of Soil for Importation and Site Reinstatement

Once the expected 2 m thick layer of impacted soil has been removed from across the site, it is proposed to import sufficient soil to bring the level of the site up to the natural ground level. However, the design related to reinstatement may change depending on the clients need in relation to the future intended land use.

If soil is imported, it should be assessed to confirm its suitability (from an environmental perspective) for the proposed residential land use (HIL B). The suitability of the material for such purposes would be assessed against the ASC NEPM (2013).

Detailed discussion regarding the assessment of soil material to be imported for site reinstatement is provided in **Section 6.10**.

5.9 Data Quality Indicators

Data quality indicators (DQI's) will be used to assess the performance in achieving the DQO's, and to assess whether the data obtained is reliable and useful for the assessment purposes. In summary, DQI's include the following:

- Accuracy – Accuracy is a measure of the closeness of a reported result against the true value;
- Comparability – Comparability is the confidence that data can be considered equivalent for each sampling and analytical event;
- Completeness – Completeness is a measure of the useable data from a sampling event;
- Precision – Precision is a measure of the reproducibility of a result;
- Representativeness – Representativeness is an expression of the confidence that data are representative of each media present on the site.

A summary of the proposed methods to be employed to ensure that the DQO's are met include the following:

Data Accuracy and Precision

- A suitably qualified and experienced Robson environmental scientist will undertake sampling and screening activities. Where applicable, a licensed ACT Class 'A' asbestos assessor from Robson would also be utilised;
- The scientist / asbestos assessor will employ appropriate sampling methods to minimise the opportunities for cross-contamination to occur between samples;
- Laboratory analysis would be undertaken only at analytical laboratories NATA accredited for the analysis to be undertaken;
- The analytical laboratory will employ their own internal quality control program which will include at least laboratory control samples, blanks, duplicates, matrix spikes and surrogate spikes. The allowable tolerance for internal laboratory QA is provided in **Section 5.7**.

Data Comparability

- The Robson environmental scientist / asbestos assessor will be suitably qualified and experienced and employ appropriate sampling methods;
- Appropriate sample storage and transportation methods will be employed, including transportation under COC conditions;
- Laboratory analysis would be undertaken only at analytical laboratories NATA accredited for the analysis to be undertaken;
- Where possible, consistent analytical methods would be employed for laboratory analysis.

Data Completeness and Representativeness

- Implementation of appropriate sampling design, with appropriate sampling density and sampling depths;
- Preparation of field notes including daily sites activities register, logs, sample plans, COC sheets, field equipment calibration registers, PID screening register, field QA / QC sample register, photographic log register, site sketches and notes, sample registers, and soil tracking records;
- Confirmation that laboratories have received samples in good order (sample receipt acknowledgement);
- Ensuring that laboratory certificates received are signed by authorised signatories and bear the NATA stamp;
- Confirmation that the laboratories have analysed as per the COC request.

6 REMEDIATION AND ASSESSMENT ACTIVITIES

All activities undertaken on the site (Stage 1 and Stage 2) are to be carried out in such a manner that adverse impact on the natural and built environment is minimised.

6.1 Control Plans

In summary the following plans have been developed in support of this remediation project to meet the ACTPLA Development Application requirements and are available out side of this Remediation Action Plan and are referred to broadly in this document (Refer **Appendix E**).

Site Establishment Plan

This plan outlines the requirements for the site establishment including items such as site sheds, fencing, car parking, stockpile locations etc (Refer **Appendix E**).

Temporary Traffic Management Plan (TTM)

This plan outlines any required traffic controls such as signage, temporary road construction, and truck turning areas within and exiting the Canberra Brickworks site.

Sediment and Erosion Control Plan (SECP)

This plan outlines any required environmental controls such as silt fences, retention ponds, stormwater infrastructure protection etc (Refer **Appendix E**).

Tree Management Plan

This plan identifies the existing trees on the site and provides control measures for protection or methodology for removal etc. It also outlines the scope for reinstatement at the completion of the works.

6.2 Asbestos

The remedial works involve the removal of vegetation from the surface of the dump to enable access to allow for the removal of asbestos containing materials and the eventual excavation and removal of soil impacted with ACM. During the excavation works associated with ACM the following precautions must be taken:

- A Class 'A' Asbestos Assessor must be present on the site during the removal of the vegetation from the dump surface to screen the vegetation for ACM. The aim of this assessment will determine whether the vegetation can be treated as ACM or green waste (refer **Appendix C** for Work Method Statements).
- A licensed asbestos removalist must be present during the handling of asbestos material and soil potentially contaminated with ACM;
- A Class 'A' Asbestos Assessor or suitably qualified environmental scientist must be present on the site during the bulk removal of soil from the site to screen material for potential contaminants other than asbestos;

- The site must be demarcated with only those wearing the appropriate PPE permitted to enter. Appropriate PPE is further discussed in **Section 7.4**. When leaving the site, PPE must be taken off at the site barrier and disposed of as contaminated waste in an asbestos waste bag to prevent any possible contamination leaving the site;
- Water spraying during any vegetation and earth disturbance activities to prevent the potential release of airborne asbestos fibres;
- High density black plastic will be used to provide lining for the ground underneath any stockpiles to prevent migration of asbestos fibres or ACM into the underlying soil. A 100 mm scrape of the area underneath the plastic would be taken by an excavator after the removal of the stockpile and plastic to remove any possible residual contamination. The remaining stockpile footprint would then be assessed for clearance by a Class 'A' Asbestos Assessor before being reinstated (if required) with uncontaminated material;
- Unless approved by the EPA following the Stage 1 ESA, the excavated material will be stockpiled on the site and assessed to determine whether the material is suitable as BRU or asbestos waste or other waste that must be disposed at a licensed land fill facility or an approved containment cell. All ACM impacted soil will be removed from the site in the presence of a Class 'A' Asbestos Assessor and a Class 'A' Removalist;
- All care must be taken when loading trucks to prevent the spillage of any material. The truck would be inspected and cleaned where required by the asbestos removalist before leaving the site to ensure ACM or debris is not present on the external areas of the truck;
- Asbestos impacted soil will only be transported in a covered leak proof vehicle in accordance with the requirements outlined in the ACT ESDD (2014) '*Information Sheet 5 – Requirements for the transport and disposal of asbestos contaminated wastes*';
- Every load leaving the site will be accompanied by the required transport certificate and a N120 sticker to identify the nature of the loads content;
- The haul route used by vehicles will be visually assessed for asbestos at the completion of work each day by a Class 'A' Assessor. Should asbestos be observed on the haul route, then this would be removed by a licensed asbestos removalist and a clearance certificate issued by the Class 'A' Assessor;
- On completion of the remediation project due to the presence of asbestos fibre in soil, the surface soil (100mm) of the haul routes within the remediation work area must be removed and the area validated (soil samples taken) in accordance with the ASC NEPM 2013.
- In the event that it is necessary (as it is the best option) to leave ACM in-situ on completion of the remedial works an EMP would be required for the future of the site to inform future workers and users of the potential risk of asbestos within the dump area. Specifically, the purpose of the EMP will be to:
 - Define the area to which the EMP applies on a registered survey plan;

- Identify relevant environmental factors and the potential contaminants of concern (e.g. asbestos) that may be present;
- Define the roles and responsibilities of persons and organisations involved in the implementation of the EMP;
- Identify the proposed management strategies to show how exposure to potential remnant asbestos may be appropriately mitigated;
- Provide procedures to evaluate whether materials encountered during construction works are suitable for the future land use;
- Provide procedures for the management and if necessary removal of contamination encountered on the site in accordance with requirements of the ACT EPA;

In addition to the above, asbestos airborne monitoring will be implemented to ensure that respirable asbestos fibres are not being produced during on-site works and / or not leaving the boundary of the site. Air monitoring will be conducted each day that vegetation removal, excavation, stockpiling or removal of the asbestos affected material is conducted. Airborne fibre monitoring shall be undertaken using the following sampling equipment:

- Battery powered pump;
- Clean connecting hose;
- Membrane filters (mixed ester of cellulose) with a 0.8 µm pore size; and
- Open face plastic filter holders.

The filter membranes will be analysed at NATA endorsed laboratories in accordance with the NOHSC 'Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Dust' (NOHSC: 3003, 2005) for both exposure and control sampling.

As discussed in **Section 5.5.4**, the control level for airborne fibre concentrations recorded during air monitoring will be 0.01 fibres/mL (f/mL). Based on the premise that exposure to asbestos fibres during removal works should be minimised for both workers and the public, Robson has adopted the 'control levels' as set out in NOHSC 2002 (2005) 'Code of Practice for the Safe Removal of Asbestos – 2nd Edition' and summarised below in **Table R**.

Table R: Air Monitoring Control Levels

Control Levels (airborne asbestos f/mL)	Control / Action
< 0.01 f/ml	Continue with control measures
≥ 0.01 f/ml	Stop work and review control measures
≥ 0.02 f/ml	Stop work and find cause (for example lack of water, wind strength)

Notes to Table C:

- ≥ - Greater than or equal to
< - Less than

The removalist and client will be notified at the end of each working day of all exceedences and the Class 'A' Asbestos Assessor is to provide approval of the proposed amended work practices before site work is allowed to recommence.

6.3 Other Potential Contaminants

The management of these contaminants relies primarily on preventing the migration of the contaminants via surface water, sediment, dust and the incorrect BRU of impacted material. The measures which will be taken to prevent this migration are outlined in **Sections 6.4, 7.3 and 7.7.**

6.4 Surface Water and Sediment

Potentially contaminated soil and surface runoff water may be generated if surface water comes into contact with disturbed areas or stockpiles of excavated soil. There is the potential for contaminated sediment and runoff water to migrate off-site and impact nearby properties and the aquatic ecosystems. If accumulated surface water requires off-site disposal then it should be assessed in accordance with the Environment ACT (2000) '*ACT's Environmental Standards: Assessment & Classification of Liquid & Non-Liquid Wastes*', and disposed of by an appropriately licensed waste water contractor.

The following control methods are required to ensure that no surface water or sediment leaves the site or pollutes the stormwater system:

- Limit the area of disturbance and undertake temporary or permanent stabilisation of disturbed areas upon completion of works;
- Vehicle access to the site should be restricted to only one exit / entry point. The access point should be stabilised using road base, 50 mm aggregate, recycled concrete or similar. Vehicle movements on the site should be restricted to formed tracks and designated parking areas. Soil and mud are to be removed from vehicle tyres before leaving the site;
- Designate an area (decontamination zone) for the washout of trucks, vehicles and plant;
- Access to and from site development activities should be minimised during and immediately after wet weather;
- Stockpiles should be located within the site area and away from the stormwater system. Diversion bunds should be erected on the high side of stockpile areas to divert potential surface water around the stockpile. Stockpiles should also be enclosed by a silt fence or continuous fence of hay bales to trap sediment in water run-off as outlined in the ACT EPA (2011) '*Environment Protection Guidelines for Construction and Land Development in the ACT*';
- Stockpiles should be less than 2 m in height;

- Divert clean water away from the disturbed areas, ensuring it is diverted to a stabilised area on the site;
- Install a sediment control barrier around the lower end of the site to prevent sediment discharge;
- Protect the storm-water system (where relevant) with sediment control measures;
- Maintain all control measures during development works e.g. silt fences must be free of rips or holes and reset as required.
- Sediment spilled, dropped or washed onto public roads must be removed immediately. The cleaned up material is to be returned to the site to be managed with other site soils. Do not wash the sediment into the stormwater system;
- Ongoing visual monitoring during site works to assess for discharges of surface water and sediment from the site; and
- If discharges do occur there may be a need to validate (take soil samples) impacted flood ways following a significant rain event or discharge of water from the site.

Further guidance regarding appropriate surface water and sediment control measures is provided in Section 4 of ACT EPA (2011) *'Environment Protection Guidelines for Construction and Land Development in the ACT'*.

Waste Water

Waste water can be generated during remedial works. Before waste water can be discharged it must be captured and assessed in accordance with the *ACT Environment Protection Regulation 2005* if the water is to be disposed of to the stormwater system and against the ActewAGL's *'Trade Waste Acceptance Note TW 1 General Acceptance Criteria for Liquid Waste'* if it disposed to sewer. Upon completion of the assessment approvals to discharge must be sought from the relevant regulatory body.

6.5 Records and Materials Tracking

Detailed records must be kept regarding remediation works on the site. The volumes of remediated soil will be assessed by pre-remediation and post remediation surveys conducted by a licensed surveyor (if required). To calculate and reconcile the volumes of remediated soil, the following survey requirements could be undertaken:

- A pre-remediation survey of the 'AD';
- A post remediation survey of the remediated area prior to the importation of clean fill;
- Surveys of any soil stockpile generated from soil removed from the dump as a part of the remediation process.

In addition, Civil Contractor (or their appointed delegate) will maintain the following records during the remediation process:

- Records regarding inductions;
- Records regarding environmental consultancy activities undertaken on the site including daily airborne fibre monitoring;
- Details of any suspicious and / or other potentially contaminated soil (for example visually impacted or odorous soil) encountered during site works and associated actions taken;
- Photographic records of excavations, stockpiles and soil relocation;
- Details of all soil sampling and excavation locations on a site plan (as provided by the Environmental Consultant);
- Details of any environmental issues / complaints and associated corrective measures;
- Records regarding the ACT ES approvals and material tracking for all soil removed from or imported onto the site;
- Remediated soil volumes will be reconciled against disposal manifests for all material disposed of to a licensed landfill facility. Therefore records must be maintained.
- Records regarding amendments to the RAP and Auditor / EPA endorsements; and
- Other relevant information provided to them by the Environmental Consultant.

6.6 Unexpected Finds Protocol (contamination and archaeological)

Due to the nature of the contamination (a heterogeneous dump) there is the potential for suspicious soils (for example visually impacted or odorous soil) to be identified during and post the remedial site development works. If identified, the Civil Contractor is to engage a suitably qualified environmental consultant to undertake a visual risk assessment and provide advice on:

- The continuation of excavation works;
- The necessity for segregation of such material; and
- Assessment of the material for suitability to remain on the site and / or for off-site waste classification or BRU.

As the site is heritage listed under the ACT Heritage Act (2004), there is the potential that an item of archaeological or historical significance may be identified during the remediation of the 'AD'.

Therefore, an archaeological consultant has been appointed and will have access to the site during remedial works. As part of the site Induction and daily tool box talk, a discussion point with regard to unexpected finds for both contaminated and archaeological finds will be on the agenda.

In all instances where an unexpected find occurs the following steps must be taken:

- Stop work;

- Notify Site Foreman; and
- Cordon off area until it can be assessed by the appropriate specialist.

6.7 Assessment of Material for BRU or Waste Disposal

Following the removal of all surface ACM (which may include soil where ACM is in high concentrations) and the subsequent completion of the Stage 1 ESA, a methodology will be determined as to the best approach to achieve waste or non-waste classification. In essence the soil should be assessed for either off/on-site BRU or waste disposal at a licensed waste facility in the ACT or to an approved containment cell. Off/on-site BRU (for example, either on-site or within the borrow pit at the WBRMC) is the preferred method of management of the 'Dump' fill soil. Should it be assessed that the material is unsuitable for BRU, the material would then be classified and disposed of off-site to a licensed waste facility or to a suitably designed and approved containment cell.

A summary of the assessment criteria are summarised in Tables in **Section 5.5**.

Sampling and laboratory analysis of excavated material should be conducted in accordance with the following ACT ES endorsed guidelines:

- Australian Standard AS 4482.1-2005 '*Guide to the investigation and sampling of sites with potentially contaminated soil – Part 1: Non-volatile and semi-volatile compounds*';
- ACT ESDD (2014) Contaminated Sites Information Sheet 4 '*Requirements for the Re-Use and Disposal of Contaminated Soil*';
- ACT ESDD (2014) Contaminated Sites Information Sheet No. 5 '*Requirements for the Transport and Disposal of Asbestos Contaminated Wastes*';
- ACT ESDD (2014) Contaminated Sites Information Sheet No. 6 '*Management of Small Scale, Low Risk Soil Asbestos Contamination*';
- Environment ACT (2000) '*Environmental Guidelines: Assessment & Classification of Liquid & Non-Liquid Wastes*';
- ASC NEPM (2013); and
- NSW EPA (1995) '*Sampling Design Guidelines*'.

The proposed scope of work for the assessment of in-situ soil ESA or stockpiles includes the following:

6.7.1 In-Situ Fill Assessment ESA

- A suitably qualified environmental scientist will be present to undertake the environmental investigation.
- Direct a suitably qualified excavation contractor to excavate test pits and trenches for the collection of soil samples (test pits and trenches must be battered as required);
- Sample locations will be located across the footprint of the 'AD' based on systematic sampling pattern. In accordance with Table A of NSW EPA (1995)

'*Sampling Design Guidelines*' a minimum of approximately thirteen (13) systematic sample points would be required for a site covering the combined site area of 4,500 m² to identify a hotspot of approximately 23.1 m diameter with 95 % confidence. In this case 15 locations are proposed within the area of impact, while seven (7) sample locations are proposed down gradient within the drainage line and three (3) up-gradient on the east side of the 'AD'. Furthermore, test pits will be connected with north-south trenches to obtain a vertical and lateral profile of the 'AD' (refer to **Figure 5**);

- Due to the known presence of asbestos, airborne fibre monitoring will be implemented to assess whether dust control measures have been effective and that respirable asbestos fibres are not being produced during on-site investigative works and / or not leaving the boundary of the site;
- Air monitoring would be undertaken in accordance with the '*Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres, 2nd Edition [NOHSC: 3003(2005)]*' and test certificates will be National Association of Testing Authorities (NATA) endorsed;
- Verbal notification of air monitoring results would be provided to the site foreman prior to commencement of next days works;
- The test pits/ trenches will be dug with an excavator half (0.5) a metre into natural soil where ever practicable. Soil samples collected and logged in general accordance with Robson Standard Operating Procedure (SOP) EAR-SOP009 '*Soil Sampling for Asbestos*' and EAR-SOP003 '*Soil Sampling and Logging*'. SOP003 stipulates the collection of samples at the ground surface (0.0 - 0.1 m), 0.5 - 0.6 m, 0.9 - 1.0 m and each metre thereafter, and at changes in lithological unit, or intersection of potential lenses of contamination;

6.7.2 Soil Stockpile(s) Assessment

- A suitably qualified environmental scientist/Class 'A' Asbestos Assessor will be present at the site to observe the excavation process and separate potentially impacted soil from soil that does not exhibit visual and / or olfactory indications of impact;
- Collection of primary soil samples from the stockpile at an equivalent sampling rate of one (1) primary soil sample per 25 m³ (may vary depending on volumes and visual assessment);
- Undertake an inspection of the stockpile with the aid of an excavator to ensure the heterogeneity of the stockpile is appropriately considered prior to sampling;
- The stockpile(s) would be sampled from depths ranging between 0.3 m and the base of the stockpile using an excavator, with the individual sample being collected from the centre of the excavator bucket to reduce the potential for contact of the soil with the excavator bucket. The samples would also be collected using a new, clean pair of nitrile gloves for each sample to minimise the potential for cross contamination between samples. The samples would be collected from locations across the stockpile to enhance representivity;
- For asbestos sampling and testing at each location a 10 litre (L) sample be collected and sieved through a 7 mm sieve. Identified ACM and FA would be

collected and weighed, and the asbestos concentration in soil at each location would then be calculated using the formula:

$$\% \text{ Soil Asbestos} = \frac{\% \text{ Asbestos Content} \times \text{ACM (kg)}}{\text{Soil Volume (L)} \times \text{Soil Density (kg/L)}}$$

To assess for AF at each sample location one (1) wetted 500 mL volume sample would also be collected. These samples would be dispatched to NATA accredited laboratory for analysis for asbestos in accordance with procedures outlined in Section 4.1.8 of the WA Guideline;

Should soil conditions result in the generation of dust (i.e. in the presence of loose, dry soil) samples that are sieved will be moistened prior to sieving to minimise the potential for dust to be generated during the sieving process.

Note: With regard to sampling for asbestos in soil, the soil may not be suitable for sieving. If this is the case the material will be manually broken up in the field to ensure ACM is not present within soil clods etc and sieved where possible. The sample taken for Fibrous Asbestos (FA) and Asbestos Fines (AF) analysis may include a combination of sieved and manual inspected soil/rock.

- For QA / QC purposes, duplicate and triplicate samples would be collected at a rate of approximately one (1) per twenty (20) primary samples, as recommended in the AS 4482.1-2005. A rinsate sample would also be collected per day of stockpile sampling. In the event that volatiles are present a trip blank and trip spike samples would also be included with the field quality program. The QA / QC samples would be labelled with no reference to the primary sample on either the sample container or the COC to ensure the analytical results are not biased by the laboratories;
- The samples will be placed into clean laboratory supplied sample containers and labelled with unique sample identification. The samples will then be placed into an ice cooled esky immediately after collection until transported to a NATA accredited laboratory;
- A duplicate of each sample will be screened in the field with a hand held MiniRae[®] 2000 PID for volatile organic compounds (VOCs). The PID will be calibrated daily prior to the commencement of works using fresh air and 100 ppm Isobutylene reference gas;
- Submission of soil and QA / QC samples to NATA accredited laboratories under COC conditions for the analysis of TPH, BTEX, PAHs, phenols, OCPs, PCBs and 8 heavy metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc);
- Preparation of a letter report for submission to EPA for endorsement detailing the results and recommendations of the assessment. The report would be prepared in accordance with the relevant sections of either NSW OEH (2011) 'Guidelines for Consultants Reporting on Contaminated Sites' (for off-site BRU) and / or Environment ACT (2000) 'ACT's Environmental Standards: Assessment & Classification of Liquid & Non-liquid Wastes' (for disposal at a licensed waste facility or containment cell).

- Details regarding EPA Auditors report review, endorsements and approvals received, volumes, tracking documentation, field notes and fate of material (for example, landfill docket) will be provided in the final validation report.

6.8 Validation of the Excavation

This section is based on the current available information related to the 'AD' and is likely to change following the ESA and subsequent remediation. However, it does provide a hypothetical basis for validation on completion of remediation.

In accordance with **Section 4.1**, the principal question to be addressed upon completion of the excavation works is *"Does the remnant soil on the site contain contaminant concentrations and / or other indicators of potential contamination that may pose an unacceptable risk to human health and / or the environment, thereby affecting the suitability of the site for the land use"?*

The scope of works and the sampling plan for the validation of the excavation has been designed in accordance with the guidelines and standards as listed in **Section 6.7**.

The proposed scope of work for the validation of the excavation includes the following:

- A suitably qualified environmental scientist will observe the walls and base of the excavation for visual and / or olfactory indications of impact;
- Validation samples would be collected from the base of the bulk excavation. In accordance with Table A of NSW EPA (1995) 'Sampling Design Guidelines' a minimum of approximately thirteen (13) systematic sample points would be required for a site covering the combined site area of 4,500 m² to identify a hotspot of around 23.1 m diameter with 95 % confidence. However, as the site is known to have been impacted with asbestos, a sampling density of twice the minimum required by WA DEC (2001) 'Development of Sampling and Analysis Programs' is considered appropriate. That is, twenty six (26) systematic validation samples will be collected to validate the base of the excavation. With regards to this, the WA Guidelines recommends the use of the WA DEC (2001) 'Development of Sampling and Analysis Programs' for the determination of the minimum sampling density. This referenced guideline is not actually endorsed by the ES for use in the ACT, however the sampling densities are equivalent to that recommended within the ASC NEPM (2013) which is endorsed by the ES for use in the ACT. The proposed twenty six (26) grid samples would be approximately 9.8 m apart and would allow for the identification of a hotspot approximately 11.5 m in diameter with 95 % confidence;
- Additional validation samples would also be collected from the walls and base of any excavation left prior to the completion of the remediation process. At this stage, the number and/or size of potential excavations is unknown. However, based on the validation requirement set out in the WA Guidelines validation samples would be collected at a lateral rate of one (1) per 5m and a vertical rate of one (1) per 1m;

- A figure specific to validation will be drawn and submitted to the Auditor for review prior to the commencement of validation sampling;
- For asbestos validation, at each location a 10 litre (L) sample be collected and sieved through a 7 mm sieve. Identified ACM and FA would be collected and weighed, and the asbestos concentration in soil at each location would then be calculated using the formula:

$$\% \text{ Soil Asbestos} = \frac{\% \text{ Asbestos Content} \times \text{ACM (kg)}}{\text{Soil Volume (L)} \times \text{Soil Density (kg/L)}}$$

To assess for AF at each sample location one (1) wetted 500 mL volume sample would also be collected. These samples would be dispatched to NATA accredited laboratory for analysis for asbestos in accordance with procedures outlined in Section 4.1.8 of the WA Guideline;

Should soil conditions result in the generation of dust (i.e. in the presence of loose, dry soil) samples that are sieved will be moistened prior to sieving to minimise the potential for dust to be generated during the sieving process.

Note: With regard to sampling for asbestos in soil, the soil may not be suitable for sieving. If this is the case the material will be manually broken up in the field to ensure ACM is not present within soil clods etc and sieved where possible. The sample taken for Fibrous Asbestos (FA) and Asbestos Fines (AF) analysis may include a combination of sieved and manual inspected soil/rock.

- For contaminants other than asbestos, the validation samples would be collected from at least 0.3 m within the surface of the soil using a new clean pair of nitrile gloves. Care will be taken to ensure that the samples have not been in contact with the wall of the sampling equipment so as to reduce the potential for cross-contamination of the sample. Any reusable sampling equipment (for example, hand trowel or dish) would be washed and decontaminated between sample locations using Decon 90 and rinsed with tap water;
- The samples will be placed into clean laboratory supplied sample containers and labelled with unique sample identification. The samples will then be placed into an ice cooled esky immediately after collection until transported to a NATA accredited laboratory;
- A duplicate of each sample will be screened in the field with a hand held MiniRae[®] 2000 PID for VOCs. The PID will be calibrated daily prior to the commencement of works using fresh air and 100 ppm Isobutylene reference gas;
- For QA / QC purposes, duplicate and triplicate samples would be collected at a rate of approximately one (1) per twenty (20) primary samples, as recommended in the AS 4482.1-2005. A rinsate sample would also be collected per day of sampling. A trip blank and trip spike samples would also be included with the field quality program. The QA / QC samples would be labelled with no reference to the primary sample on either the sample

container or the COC documentation to reduce the potential for the analytical results to be biased by the laboratories;

- Submission of the primary and QA/QC samples to NATA accredited laboratories under COC conditions for the analysis of contaminants commonly associated with fill material including TRH, BTEX, PAHs, phenols, OCPs, PCBs and eight (8) metals if these potential contaminants are found to be of concern during the ESA.

In addition to the above, a licensed Class 'A' asbestos assessor would also undertake a walkover of the excavation area and provide a clearance certificate if no visible assessment is identified.

6.9 Quality Assurance and Quality Control

QA/QC methods are to be undertaken in accordance with AS4482.1-2005 '*Guide to the investigation and sampling of sites with potentially contaminated soil – Part 1: Non-volatile and semi-volatile compounds*'. QA/QC assessment of field activities would be undertaken, while a review of the internal QA/QC practices of the relevant laboratories would be conducted to assess the quality of analytical results.

Field QA/QC sampling protocols would include the collection of the following types of QA/QC samples during sampling:

- A duplicate sample, which is a sample collected at the same place and time as the routine sample and intended to represent the same entity as closely as possible. Duplicate samples would be collected at a rate of one (1) duplicate collected for every twenty (20) primary samples collected;
- A triplicate sample, which is a sample collected at the same place and time as the routine sample and sent to a second laboratory to assess the quality of the primary laboratories testing procedures. The sample is intended to represent the same entity as the routine sample as closely as possible. Triplicate samples would be collected at a rate of one (1) sample per twenty (20) primary samples collected;
- Rinsate samples would be collected to assess the effectiveness of the decontamination procedures used on re-usable equipment. These samples would be collected by pouring laboratory supplied deionised water over a piece of decontaminated equipment and into sample bottles and analysed. One (1) rinsate sample would be collected per day of sampling.
- A trip spike is a sample with known quantities of the analytes of interest supplied by the laboratory in the same type of container that is required for the analytical test of a sample collected in the field. These samples must be taken from the laboratory to the sampling site and returned to the laboratory unopened. The samples are a required quality control element for all sampling and analysis events. The laboratory will check for degradation of analyte during collection/storage/handling of field samples.
- A trip blank is laboratory supplied clean sand in a sealed sample jar. The jar is placed with the field samples and transported with the field samples to the laboratory for testing for the volatile analytes of the contaminant suite. The

purpose is to determine the potential for cross contamination during sampling and sample transport.

All samples will be stored in an ice cooled sealed container with chain of custody documentation and transported to a NATA registered laboratory.

All reusable sampling equipment will be decontaminated between each sampling event by washing in clean tap water then in a solution of laboratory-grade phosphate free detergent (Decon 90) followed by rinsing with deionised water.

The sample and analytical plan for the ESA and site validation is summarised in Table S and T (overleaf).

Table S: ESA - Proposed Sample and Analytical Plan

Location	Rate or Number of Samples Proposed	Analytes
Asbestos Dump 0.45 ha	Fifteen (15) test pits within the presumed dump footprint Three (3) samples per test pit – two (2) in fill and one (1) in natural	Eight (8) metals and asbestos (all samples); TRH, BTEX, PAH, Phenols, OCP, PCB (1 per test pit) Pathogens: E coli, Faecal Coliforms and Total Coliforms (to be included adjacent the Septic Tank).
	Seven (7) test pits down gradient within the drainage line and three (3) test pits up gradient from the dump. Two (2) samples per test pit – one (1) surface and one (1) in natural (additional samples to be taken if extensive fill is observed	Eight (8) metals and asbestos (all samples); TRH, BTEX, PAH, Phenols, OCP, PCB (1 per test pit)
	1 per test pit	CEC, organic carbon, clay content, iron and pH
QA/QC Samples	Duplicate samples One (1) duplicate per 10 primary samples and one (1) triplicate per 20 primary samples and one (1) rinsate per field day. One (1) trip spike and one (1) trip blank per sample batch	PAHs, eight (8) metals and asbestos Trip blank and trip spike – BTEX and TRH C ₆ -C ₉ only.

Notes:

Cation Exchange Capacity (CEC), pH and clay content analyses are required for the derivation of EILs in accordance with the ASC NEPM (2013).

Table T: Validation - Proposed Sample and Analytical Plan (presumed asbestos only).

Location	Rate or Number of Samples Proposed	Analytes
Asbestos Dump 0.45 ha	Fifteen (26) test pits; One (1) sample per surface sample (0.0 – 0.1m)	Asbestos (and other analytes as required as determined during the Phase 1 ESA)
	Not required	CEC, organic carbon, clay content, iron and pH
QA/QC Samples	Duplicate samples One (1) duplicate per 20 primary samples and one (1) triplicate per 20 primary samples and one (1) rinsate per field day.	Asbestos (and other analytes as required as determined during the Phase 1 ESA)

Notes:

Cation Exchange Capacity (CEC), pH and clay content analyses are required for the derivation of EILs in accordance with ASC NEPM (2013).

6.10 Assessment of Imported Soil

Subsequent to validation of the excavation base, it is proposed to import sufficient soil to reinstate the site to the natural ground level provided it is appropriate to the future development. If imported fill is required on site the fill must be assessed before it is imported to ensure it is suitable for the proposed site use which may require chemical testing. The assessment should also be reviewed by the Site EPA Accredited Auditor prior to the importation of fill. Approval from the ACT ES to import fill onto a site is required.

As general guidance, the soil is to be either virgin excavated natural material (VENM) or is to be sampled to confirm that the quality of the soil meets the site assessment criteria identified in **Section 5.5.1**. The aesthetic suitability of the soil will also need to be considered. Material that would be considered to be aesthetically unsuitable may exhibit one (1) or more of the following characteristics:

- Odorous soil;
- Soil with visible chemical or hydrocarbon staining; and
- Soil with greater than 5 % waste material (e.g. bricks, plastic, metals etc).

The source of soil to be imported is unknown at this stage.

7 HEALTH AND SAFETY MANAGEMENT PLAN

7.1 Site Safety Management Plan

A site safety management plan (SSMP) would be prepared to provide guidance for workers and establish safe work practices to protect against possible adverse exposure to site contaminants that may be encountered during field remedial activities.

Industry standard health and safety procedures would be implemented at all stages of the remedial works program to be undertaken at the site. The procedures will be compiled into the SSMP which will comprise of the following information:

- A designated project health and safety officer (PHSO);
- Site induction program for all staff, environmental consultancy personnel and contractors who have the potential to come into contact and / or be exposed to potentially contaminated soil and / or water;
- Safe work practices;
- Emergency and incident response measures, muster points and contact details;
- Locality map to nearest hospital;
- Hazards on site;
- Potential exposure pathways for contaminants of concern;
- Site control measures;
- Material safety data sheets (for example, chemicals that would potentially be present on the site or be brought to the site);
- PPE requirements; and
- Health and safety compliance agreement.

In addition to the above, as a significant proportion of the remedial works involves the handling of ACM impacted materials, the SSMP should also contain a site specific Asbestos Removal Control Plan (ARCP) prepared by the Asbestos Removalist. The ARCP must comply with this RAP and include at a minimum the following detail (Refer **Appendix C** for guidance).

- Assign responsibilities to ensure that the whole project is adequately supervised by a person holding the Asbestos Removal licence or their qualified supervisor on site at all times during asbestos removal;
- Assign responsibilities to ensure that all personnel working on the project are suitably trained so that the work can be carried out safely and are fully aware of the health risks associated with exposure to asbestos;
- Detail requirements of water spray/misting is used to minimise dust generation;
- Sequence and schedule of work and completion dates;
- Assign responsibilities for removal works including nominated Supervisor;

- Emergency Procedures;
- Preparation of Work Area and Removal Areas;
- Preparation of boundaries, including the type and extent of isolation required and the location of any signs and barriers;
- Post warning signs and barrier tape in and around the Work Area and restrict access to Work Area to personnel approved by the asbestos removalist or Site Project Manager;
- Detail PPE requirements and ensure PPE is being used in compliance with the requirements outlined in the ARCP;
- Decontamination procedures for tools and equipment, personal decontamination and the decontamination of non-disposable personal PPE and respiratory protective equipment (RPE);
- Handling and disposal procedures for ACM;
- Methods for removing the ACM;
- Abatement methods and procedures;
- Methods of disposing of asbestos wastes, including details on the disposal of protective clothing and equipment; and
- Final decontamination and clean-up procedures.

All site personnel must comply with the asbestos removalist's instructions with regards to ACM material.

All environmental consultant personnel and contractors conducting remediation fieldwork would be required to sign in acknowledging that they understand the SSMP. The SSMP is to be available to all staff, environmental consultancy personnel and appointed contractors during the remedial works.

In the instance where any additional work task on the site arises, or working conditions change, the SSMP may be revised during the course of the project as more information becomes available. If a revision is issued, all environmental consultant personnel and other contractors conducting remediation fieldwork would be required to become familiar with the information and sign in under the new plan to acknowledge that they understand the changes to the plan.

7.2 Project Health and Safety Officer

A PHSO is to be on site at all times when work is being performed. The PHSO must be trained in First Aid and hold a current First Aid Certificate from a legitimate organisation (for example St John's Ambulance). The PHSO for the project will be nominated prior to remedial works occurring.

All Contractor(s) are to provide a list of nominated personnel who will be the PHSO for their company while operating on site.

7.3 Hazards Regarding Asbestos and Other Potential Contaminants

The remedial works may potentially expose personnel and contractors to asbestos and other contaminants of concern including TRH, BTEX, PAH, Phenols, OCP, PCB and eight (8) heavy metals. The hazards associated with asbestos include that inhalation of fibres can cause asbestosis, lung cancer and mesothelioma. The other potential contaminants contain carcinogens and the potential for carcinogens and can cause health effects such as poisoning if ingested and irritation on dermal contact.

Project personnel may be exposed to any or all of the above chemicals while working on the site particularly when disturbing soil / water during the remedial works. Chemicals could enter the unprotected body via the following exposure pathways:

- Dermal contact - This may include direct contact with contaminated fill, dust or fluids (including surface water and groundwater);
- Ingestion - Contaminated fill, dust or fluids;
- Inhalation - Airborne dust, mists, fumes, vapours;
- Injection - Contaminated fill, dust or fluids entering a puncture wound.

PPE plays a major role in ensuring that all personnel are protected against exposure to chemical hazards. Details regarding the type of PPE to be used during this project are addressed below in **Section 7.4**.

7.4 Personal Protective Equipment

PPE plays a major role in ensuring that all personnel are protected against exposure to asbestos, hydrocarbons and other potential contaminants of concern. The recommended PPE that should be available on-site to all personnel / contractors undertaking activities with the potential to result in contact with soil includes:

- A hard hat (where overhead structures (trees) / machinery are present);
- Safety glasses or goggles;
- Safety boots;
- Chemical resistant gloves (solvgard / nitrile type) are to be worn whenever there is the possibility of contact with contaminated soil, water or equipment;
- Coveralls / long-sleeved short and long pants;
- High visibility vest/clothing (preferably cotton or disposable cover-alls). If high visibility clothing is not available then a high visibility vest must be worn;
- Dust masks to protect against inhalation of dusts and asbestos fibres (for example a Class P2 (vapour filtre if volatiles are encountered) mask conforming to Australian / New Zealand Standard AS/NZS 1716:2003 '*Respiratory Protection Devices*');
- Tyvek suit to protect skin and clothing from coming in contact with asbestos and other contaminants of concern; and

- Sunscreen (use as required).

Other occupational PPE to that listed above may also be required for specific occupational tasks (for example, ear plugs and heavy duty chemical protective gloves).

7.5 Safe Work Practices

Eating, drinking, chewing gum or tobacco, smoking or any other practice that involves hand to mouth transfer, increases the risk of ingesting foreign matter (including water and/or soil that contains contaminants of potential concern) into the body. Hands must therefore be washed thoroughly before eating, drinking or smoking. Clothing that becomes dirty from on-site work should be washed separately from other clothing. A first aid kit must be present on site at all times during field work.

7.6 Site Control Measures

The following standard safety and environmental controls will be implemented at all stages of the remedial works.

7.6.1 Site signage

An ACT Government Project Sign will be erected prior to the works starting on site. This will include all the standard information including contact details for the site foreman, as well as the consultants and government agencies involved in the project.

7.6.2 Car parking

Contractor car parking will be adjacent to the site sheds. Due to the nature of the work there will not be a large workforce on the site at any one time. Any overflow parking will be outside the main Canberra Brickworks Complex site fence so as not to impede on the operations of the existing tenants within the complex. This will be identified on the site establishment plan.

7.6.3 Restricted Access and Vehicle Decontamination

Only inducted site personnel will be permitted on the site whilst remediation and reinstatement works are in progress. No members of the public will be allowed on the site during this time.

A temporary traffic management plan (TTMP) has been designed outlining the required site access route with appropriate signage.

Also access to the site will be via designated access ways. The main access for vehicles entering the contaminated area will have a rubble shaker located within the work zone denoted as a decontamination zone. This will enable all vehicles to be inspected and external debris removed as required prior to vehicles leaving the site. This method will greatly reduce the risk of fill soil being tracked off site.

7.6.4 Site Security

The Capezio & Co foreman (the Principal Contractor) is responsible for the security of the work site during the remediation and reinstatement works and is to make sure that the fencing is maintained and suitable for the site.

The fence will consist of mesh panels approximately 1800 mm high, set in concrete block feet and clamped together. The purpose of the fence is to deter trespassers and provide clear delineation between the work site and the surrounding property.

All access gates will be lockable and managed by the Capezio & Co foreman on a daily basis. To enhance security a suitably qualified security service provider will be engaged to monitor the site and respond to any suspected breaches of the perimeter fence outside working hours.

7.6.5 Movement of Vehicles and Equipment

Remedial works will involve the movement of excavators, trucks and other vehicles. All personnel on foot should be aware of designated traffic routes and plant/equipment operating around them. Contractors would have designated personnel (spotter) to guide their driver during works on the site and equipment movements as required.

7.6.6 Operation of Equipment and Machinery

Only persons trained and licensed will operate site machinery. The contractors are required to demonstrate that they have completed appropriate training to operate the relevant equipment and they will sign an agreement stating they comply with the requirements.

7.6.7 Confined or Enclosed Spaces

No entry into confined space is proposed for this project. If entry to a confined space is required, the contractor would designate a competent and responsible confined space operator to perform the task. Entry into confined spaces will only be conducted by appropriately trained personnel and with appropriate safety equipment (air-supply regulator, personal gas monitor etc). The appointed operator must complete a confined space permit and must follow the requirements for a confined space entry.

7.6.8 Underground and Above Ground Services or Utilities

Other than the known sub-surface redundant septic tank and stormwater drain which is thought to pass through the centre of the site, no other below ground services are known to exist within the dump. This is expected to be further confirmed on receipt of comments from the ACT based utilities specific to the DA.

However, to ensure a high level of safety is maintained during the remedial works, if any suspect structure is exposed or damage to a service occurs, then the appropriate service provider would be advised immediately. The principal contractor

would also be informed who will then communicate the event to ACTPG and other stakeholders as required.

7.6.9 Excavation

Excavation can cause rapid exposure and release of contaminants in soils. Soil samples and photographs will be taken as soon as practicable whilst sampling pits are opened. Following excavations, pits will be filled in and track rolled as soon as possible. If left open, all excavations will be appropriately fenced (temporary high visibility para-webbing fencing, soil mounding) and clearly marked with warning signs and tape. Any excavation that is greater than 0.7 m in depth will not be entered. If entry to an excavation greater than 0.7 m deep is required, then shoring or battering back of excavation walls to a natural angle will be conducted prior to entry. Also, excavations will not be entered in the event where water seepage is occurring.

7.6.10 Fire

To ensure the prevention of fire, smoking or the use of a lighter or matches anywhere on-site is strictly prohibited. Heavy machinery is required to carry a fire extinguisher at all times and a minimum of (two) 2 dry powder fire extinguishers be present near the active work areas.

7.6.11 Material Safety Data Sheets

MSDS's for the chemicals that will potentially be used on the site during the remedial works by Robson and subcontractors will be included in the SSMP.

7.6.12 Disposal of Garbage

All personnel should ensure that the workplace area is kept tidy at all the times and shall dispose of any rubbish generated into designated waste containers. Tyvek suits and any disposal P2 should be disposed of as asbestos contaminated waste. Half-face respirators with P3/vapour cartridges may be decontaminated and reused by the worker.

7.7 Dust

Airborne dust may be generated by wind action during disturbance of the ground surface. There is the potential for contaminated dust to migrate off-site and impact nearby properties, in addition to potentially causing a degradation of the local amenity. The target for dust control is that visible dust not be present during the works.

The following dust control methods are required to minimise the potential for dust generation and associated impacts:

- Where possible, minimise the areas of soil disturbance and soil stockpiling;
- Where an area of works is completed, that area should be revegetated as soon as practicable to reduce the potential for the generation of dust;

- Earthworks and movement of soils are to cease in dry and high wind conditions;
- Water spraying and or the employment of other stabilisation methods (for example covering with matting, vegetation or mulch) for dust suppression on unsealed roads, dusty surfaces, disturbed areas and stockpiles. Care should be taken to prevent over-wetting which may otherwise result in surface water and / or sediment issues. Note that the ACT ES should be contacted regarding the suitability of water spraying if drought conditions exist during remedial works;
- If necessary, tarpaulins would be used to provide a temporary wind break and / or to cover stockpiles;
- On-site vehicle movements and the speed of such vehicles should be minimised;
- Soil loads should be covered during transportation;
- Stockpiles should be less than 2 m in height;
- Dust levels are to be visually monitored during site works, that is they must not be visible;
- Daily site inspections to assess the need to modify the arrangement for dust minimisation and / or control; and
- Dust levels would be visually monitored continuously during site work. Records of periods of excessive dust generation, including complaints received (if any), and mitigation measures implemented are to be maintained by the appointed civil contractor.

If it is proven not to be possible to control the dust by the above methods work contingencies may need to be considered and could include:

- Alternative working hours or days when wind is at a minimum or residents or workers are not present; or
- Tenting the work area or part of as required.

7.8 Noise

Noise represents a health risk to workers and those in the vicinity of the site. Increased noise levels may result from the undertaking of remedial works, particularly through the use of excavation equipment and other associated plant, machines and vehicles. The civil contractor will therefore be required to undertake the works in accordance with local noise regulations applicable to the site and works will only be conducted during the standard business hours (7 AM to 5 PM Monday to Friday). Furthermore, no work will be undertaken on the weekends or public holidays.

The *Environment Protection Regulation 2005* indicates that the noise standard for the expected periods of work is 50 dB(A). It is also noted that Section 27 of the *Environment Protection Regulation 2005* indicates that noise is not taken to cause environmental harm in an affected place if the noise is emitted in the course of

preventing, minimising or remedying another environmental harm (note the RAP is for the remediation of impacted soil). With the above in mind, noise monitoring is therefore considered to not be necessary for the duration of the remedial works.

Should noise complaints be received as a result of remedial works, work will cease and a noise assessment would take place. If necessary, modifications to the work site, excavation equipment or work methods would occur to reduce noise. In addition, personnel regularly exposed to loud machinery noise, must wear appropriate and clean hearing protection. Records of complaints and mitigation measures implemented are to be maintained by the appointed civil contractor.

7.9 Odours

It is not expected that any significant odours would arise from the remedial works. However, Robson will have on hand an odour suppressant ('biosolve') during the remedial works. Other odour mitigation measures which may be employed include:

- Covering odorous material with plastic sheeting, if it has to be left for a considerable time;
- Consideration of weather conditions prior to events and excavation of soils;
- Monitoring for obvious odours on the site boundary. This would also include hourly screening with a hand held photoionisation detector (PID), with a trigger level for cessation of excavation works of 50 parts per million (ppm). Continual monitoring may be necessary if particularly odorous material is encountered or complaints are received. Records of monitoring results, complaints (if any), and mitigation measures implemented are to be maintained by the appointed civil contractor.

7.10 Community Consultation

As part of the Development Application process in the ACT, all development plans are available to the public for consultation. Responses to concerns raised by the public regarding the proposed development (including remediation) are prepared by ACT Planning and Land Authority prior to the Notice of Decision being released.

Should the community have concerns with the remedial works, complaints can be made via the civil contractor (or their appointed delegate) via the contact details provided on the site signage.

In addition to the above, it is noted that there is generally a heightened public awareness of asbestos contaminated sites within the ACT. To reduce public concern regarding remedial works all adjacent business and residences must be informed. Restricted remedial working hours may need to be considered depending on the community concerns.

7.10.1 Warning Signs and Complaints Register

Prior to the removal of the asbestos waste appropriate signs must be in place. The signs must comply with the requirements of NOHSC 2002 (2005) '*Code of Practice for the Safe Removal of Asbestos – 2nd Edition*'. The signs will be affixed on

boundary fences to notify the general public of the hazards associated with the site works. The signage shall include a contact name and telephone numbers in the event that a complaint by the public is to be lodged.

In the event that the proposed scope of work changes significantly, adjoining site residences and businesses will be informed prior to the commencement of the altered works program.

Capezio (or their appointed delegate) will establish and maintain a Complaints Register detailing:

- The nature of any complaints received, irrespective of the form of communication;
- The time and date of the complaint;
- The name and contact details of the person making the complaint; and
- The correction actions taken to address the complaint.

The Complaint Register will be maintained on site and will be available for inspection by the ACT ES or other Stakeholders as listed in the Communication Strategy.

7.11 Emergency and Incident Control Measures

7.11.1 Emergency Control Measures

An emergency condition is considered to exist if:

- Any personnel are involved in an accident or experience any adverse effects or symptoms of exposure while on the site;
- A condition is discovered that suggests the existence of a situation more hazardous than anticipated;
- Fire, bomb threat, failure of a structure and/or an explosion.

The first emergency response must be for all personnel (primarily the Site Foreman) to ensure there is no immediate threat to life or health before proceeding to control/contain the spill or other type of emergency situation. If the situation is not safe then the response must be left to the public Emergency Services Site Manager.

In the event of an emergency or accident causing injury at the site, where there is no immediate threat to life or health, this procedure below would be followed:

1. Stop work and remain calm;
2. Work together to:
 - *Control* the emergency within capabilities of training (i.e. shut down all equipment and evacuate the area).
 - *Contain* the emergency within capabilities of training (i.e. stop any spills or fire from spreading and / or provide first aid to injured parties).

- *Clean Up* once approved by the Project Manager, client or authorities, clean up activities would be undertaken to prevent further incidents or emergencies;
- 3. All personnel shall leave the work zone they are present in and report to the central emergency assembly area (to be detailed in the SSMP). If this location is not considered safe then an alternate location will be provided. No project personnel or visitors are to leave the assembly area unless advised to do so by the project health and safety officer (PHSP);
- 4. Refer to Material Safety Data Sheets (MSDS) of chemicals if associated with the emergency; and
- 5. Await further instructions from the on duty project health and safety officer.

In the event of a fire or life threatening emergency, the fire brigade / ambulance / police shall be contacted on **000** or **112** (mobile phones only). The Robson Project Manager/Site Foreman shall be contacted, who would then notify the client and / or other necessary parties.

The closest medical facility with an emergency room is the Canberra Hospital, Yamba Drive, Garran ACT. Contact details for the hospital and a map illustrating the route from the site to the hospital should be provided in the SSMP.

7.11.2 Incident Control Measures

Any accident, incident or dangerous occurrence that occurs on site would be reported to the Robson Project Manager/Site Foreman within one (1) hour of the incident. Any incidents, accidents, near misses and / or dangerous occurrences will also be reported to the client's representative. All contractors involved with the remedial works are required to report any accidents, incidents or dangerous occurrences to any Robson field personnel, or if they are unavailable to the Robson Project Manager or the Site Foreman.

In the event of an unintentional release to the environment for example a fuel, oil, hydraulic fluid release from on-site plant, it would be expected that the Civil Contractor will be equipped with an adequate spill kit to contain, appropriately remove and store such waste until such time that off-site disposal is approved by the relevant authority (e.g. The ACT ES). A spill of this type must be recorded on site as an incident.

In the case of an injury, the site supervisor shall take appropriate first aid measures or direct a responsible person to take such matters. All incidents shall be managed in a manner that conforms to all requirements of relevant legislation and minimises the adverse effects of the incident.

The Robson Project Manager would investigate the cause of the accident, incident or dangerous occurrence to enable changes in work procedures. The Robson Project Manager shall also ensure that reports for any accidents, incident, or dangerous occurrence that occurs during the remedial works to either Robson personnel or other contractors are completed within twenty four (24) hours and are



submitted to the appropriate authorities (for example, WorkSafe ACT and the ACT ES).

8 CONCLUSIONS AND RECOMMENDATIONS

This RAP has been prepared to address contamination issues to assist with making the site suitable for the potential redevelopment for residential (HIL 'B') land use.

The site is currently being upgraded to prepare the site for future high density residential land use. Several previous environmental assessments have been undertaken which have identified the presence of ACM in the area of impact.

The proposed staged RAP and associated works have been designed to meet the following objectives:

- Reduce potential risk to any site occupiers and the surrounding environment;
- Minimise potential risks to human health and the environment from contaminated materials;
- Develop and adopt a strategies which allows for the expeditious completion of remedial works with minimal disturbance to adjoining properties;
- Outline a remedial scope, validation and environmental monitoring for the site;
- Ensure the remediation work complies with and satisfies relevant legislation.

The RAP has also documented the following:

- The remedial goals and DQO's for site remediation (Stage 1 and Stage 2);
- The scope of works for the proposed Stage 1 remedial works, the subsequent ESA, the anticipated Stage 2 remedial works and validation works;
- A SSMP to reduce risks to human health and the environment associated with the proposed vegetation and surface ACM removal, the ESA and the subsequent Stage 2 remediation and site validation works.

It is concluded that implementation of the works proposed in this staged RAP will assist in making the site suitable for the proposed land use. It is also considered that the proposed remediation works are not likely to present significant risks to human health and the environment on surrounding properties.

It is recommended that, subject to Auditor review and endorsement and ACT Development Approval, this RAP be implemented during the proposed remedial works.

9 REFERENCES

- ACT *Dangerous Goods (Road Transport) Act 2009.*
- ACT *Dangerous Substances Act 2004.*
- ACT *Environment Protection Act 1997.*
- ACT *Environment Protection Regulation 2005.*
- ACT *Planning and Development Act 2007.*
- ACT EPA (2009) '*Contaminated Sites – Environment Protection Policy*'.
- ACT EPA (2011) '*Environment Protection Guidelines for Construction and Land Development in the ACT*'.
- ACT ESDD (2014) '*Information Sheet 4 - Requirements for the reuse and disposal of contaminated soil in the ACT*';
- ACT ESDD (2014) '*Information Sheet 5 Requirements for the transport and disposal of asbestos contaminated wastes*';
- ACT ESDD (2014) '*Information Sheet 6 - Management of small scale, low risk soil asbestos contamination*';
- Australian Standard AS4482.1-2005 '*Guide to the sampling and investigation of potentially contaminated soil – Part 1: Non-volatile and semi-volatile compounds*'.
- Australian Standard AS4964-2004 '*Method for the Qualitative Identification of Asbestos in Bulk Samples*'.
- Australian Standard / New Zealand Standard AS/NZS 1716:2003 '*Respiratory Protection Devices*'.
- Bureau of Mineral Resources, Geology and Geophysics (1984) '*Hydrogeology of the Australian Capital Territory and Environs*' 1:100,000 scale map sheet.
- Bureau of Mineral Resources, Geology and Geophysics (1992) '*Canberra*' 1:100,000 Geological Series map sheet (sheet 8727).
- Connell and Wagner 2001 - *Appendix F-Brickworks Contamination Report*
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NEPC (1999) '*National Environment Protection (Assessment of Site Contamination) Measure 1999*' (amended 2013).

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NOHSC (2002, 2005) '*Code of Practice for the Safe Removal of Asbestos – 2nd Edition*'.

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NSW DEC (2007) '*Guidelines for the Assessment and Management of Groundwater Contamination*'.

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NSW EPA (1995) '*Sampling Design Guidelines*'.

NSW EPA (1997) '*Guidelines for Consultants Reporting on Contaminated Sites*'.

NSW OEH (2011) '*Guidelines for Consultants Reporting on Contaminated Sites*'.

Robson Laboratories Pty Ltd (October 2006) '*Environmental Investigation – Audit Report Yarralumla Brickworks Block 1 Section 102 Yarralumla Canberra Central ACT*'. (Robson reference 3144_CL_EI Final_20061018).

Robson Laboratories Pty Ltd (2007) '*Remediation Action Plan - Asbestos Dump Yarralumla Brickworks Block 1 Section 102 Yarralumla Canberra Central ACT*'. (Robson reference 3144_CL_RAP_20070612).

Robson (2010) '*Soil Sampling and Logging*' (Robson reference EAR-SOP003).

US EPA (2000) '*Data Quality Objectives Process for Hazardous Waste Site Investigation*' (EPA QA/G-4HW).

WA DEC (2001) '*Development of Sampling and Analysis Programs*'.

WA DOH (2009) '*Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia*' (WA Guidelines).

10 ABBREVIATIONS

ACM	Asbestos Containing Material
ACT	Australian Capital Territory
ACTPLA	ACT Planning and Land Authority
AF	Asbestos Fines
AHD	Australian Height Datum
AMP	Asbestos Management Procedure
AS	Australian Standard
bgl	Below Ground Level
BRU	Beneficial Re-Use
BTEX	Benzene, Toluene, Ethyl benzene, Xylenes
CMP	Contaminant Management Plan
COC	Chain of Custody
CSM	Conceptual site model
DA	Development Application
DEC	Department of Environment and Conservation
DOH	Department of Health
DQI	Data Quality Indicator
DQO	Data Quality Objectives
EIL	Ecological Investigation Level
EPA	Environment Protection Authority
EPU	Environment Protection Unit
ES	ACT Environmental Standards
ESA	Environmental Site Assessment
FA	Fibrous Asbestos
ha	Hectare
HIL	Health-based Investigation Level
HRA	Health Risk Assessment
km	Kilometre
L	Litres
L/sec	Litres per second
LOR	Limit of Laboratory Reporting
mm	Millimetres
m	Metres

m ²	Square Metres
m ³	Cubic metres
mg/kg	Milligrams per Kilogram
mg/L	Milligrams per litre
MSDS	Material Safety Data Sheets
NATA	National Association of Testing Authorities
NEPC	National Environment Protection Council
NEPM	National Environment Protection Measure
NOHSC	National Occupational Health and Safety Commission
NSW	New South Wales
OEH	Office of Environment and Heritage
ORS	Office of Regulatory Services
PAH	Polycyclic Aromatic Hydrocarbons
PHSO	Project Health and Safety Officer
PID	Photoionisation Detector
PPE	Personal Protective Equipment
ppm	Parts Per Million
QA	Quality Assurance
QC	Quality Control
OCP	Organochlorine Pesticides
RAP	Remedial Action Plan
RPD	Relative Percent Difference
RPE	Respiratory Protection Equipment
SAQP	Sampling and Analysis Quality Plan
SOP	Standard Operating Procedure
SSMP	Site Safety Management Plan
SWMS	Safe Work Method Statement
TCLP	Toxicity Characteristics Leaching Procedure
TDS	Total Dissolved Solids
TP	Test Pit
TPH	Total Petroleum Hydrocarbons
UCL	Upper Confidence Limit
US EPA	United States Environmental Protection Agency
VENM	Virgin Excavated Natural Material
VOC	Volatile Organic Compounds

SO⁴

w / w	Weight for weight
WBRMC	West Belconnen Resource Management Centre
µm	Micrometre

505



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FIGURES

507



LEGEND

APPROXIMATE SITE LOCATION



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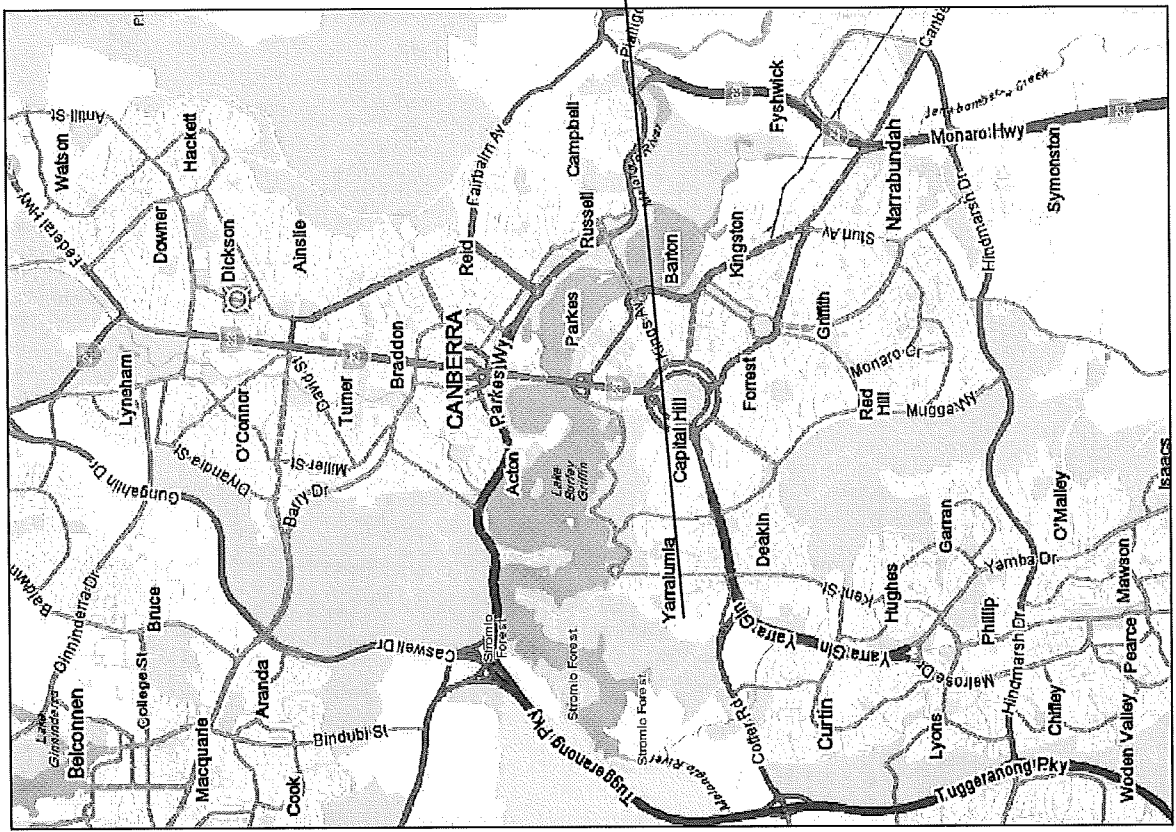
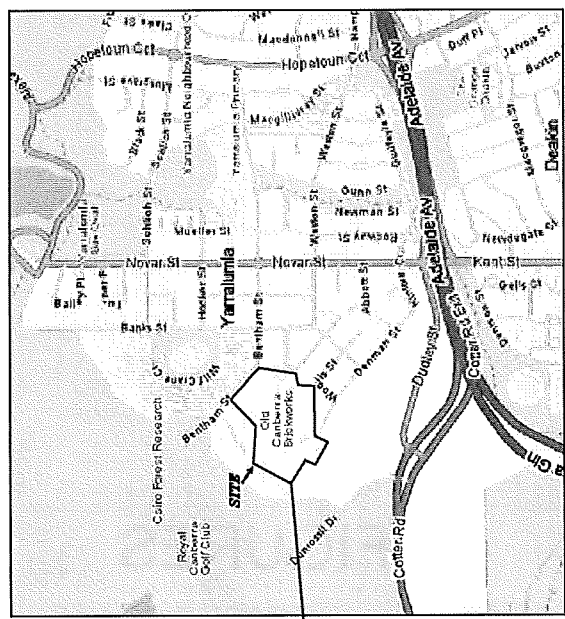
Project: CANBERRA BRICKWORKS
 REMEDIAL ACTION PLAN

Location: CANBERRA BRICKWORKS (AREA OF CONCERN)
 (BLOCKS 1 & 20 SECTION 102 AND BLOCK 1 SECTION 127)
 YARRALLUMLA ACT 2800

Drawing Title:

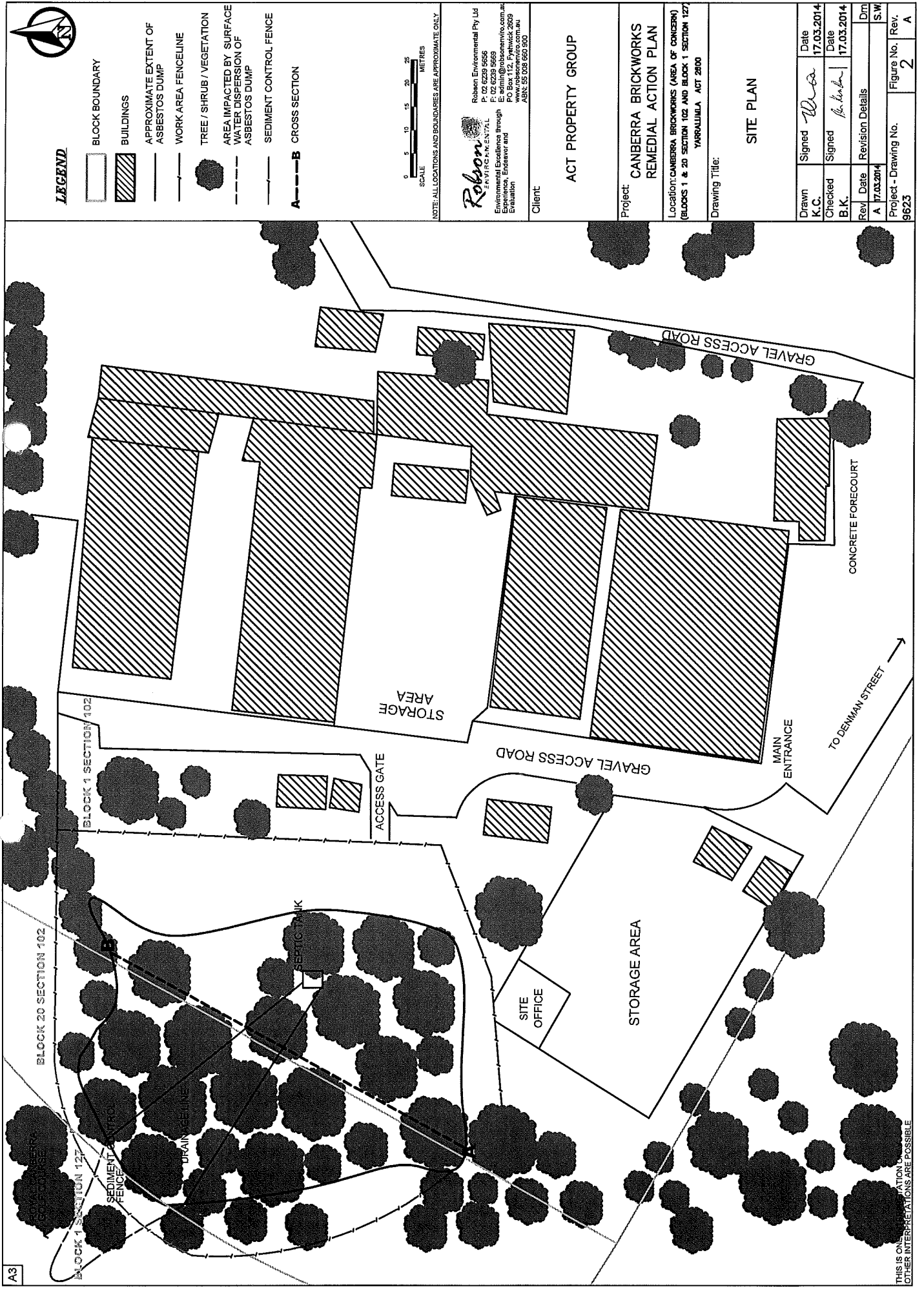
SITE LOCATION PLAN

Drawn K.C.	Signed <i>W.A.</i>	Date	17.03.2014
Checked B.K.	Signed <i>B.K.</i>	Date	17.03.2014
Rev A	17.03.2014	Revision Details	
Dim			
S/W			
Project - Drawing No.	Figure No.	Rev.	A
9623	1		



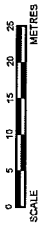
DIFFERENT SCALES

THIS IS ONE INTERPRETATION ONLY
 OTHER INTERPRETATIONS ARE POSSIBLE



LEGEND

- BLOCK BOUNDARY
- BUILDINGS
- APPROXIMATE EXTENT OF ASBESTOS DUMP
- WORK AREA FENCELINE
- TREE / SHRUB / VEGETATION
- AREA IMPACTED BY SURFACE WATER DISPERSION OF ASBESTOS DUMP
- SEDIMENT CONTROL FENCE
- CROSS SECTION



NOTE: ALL LOCATIONS AND BOUNDARIES ARE APPROXIMATE ONLY.

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Client:
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Project:
CANBERRA BRICKWORKS REMEDIAL ACTION PLAN

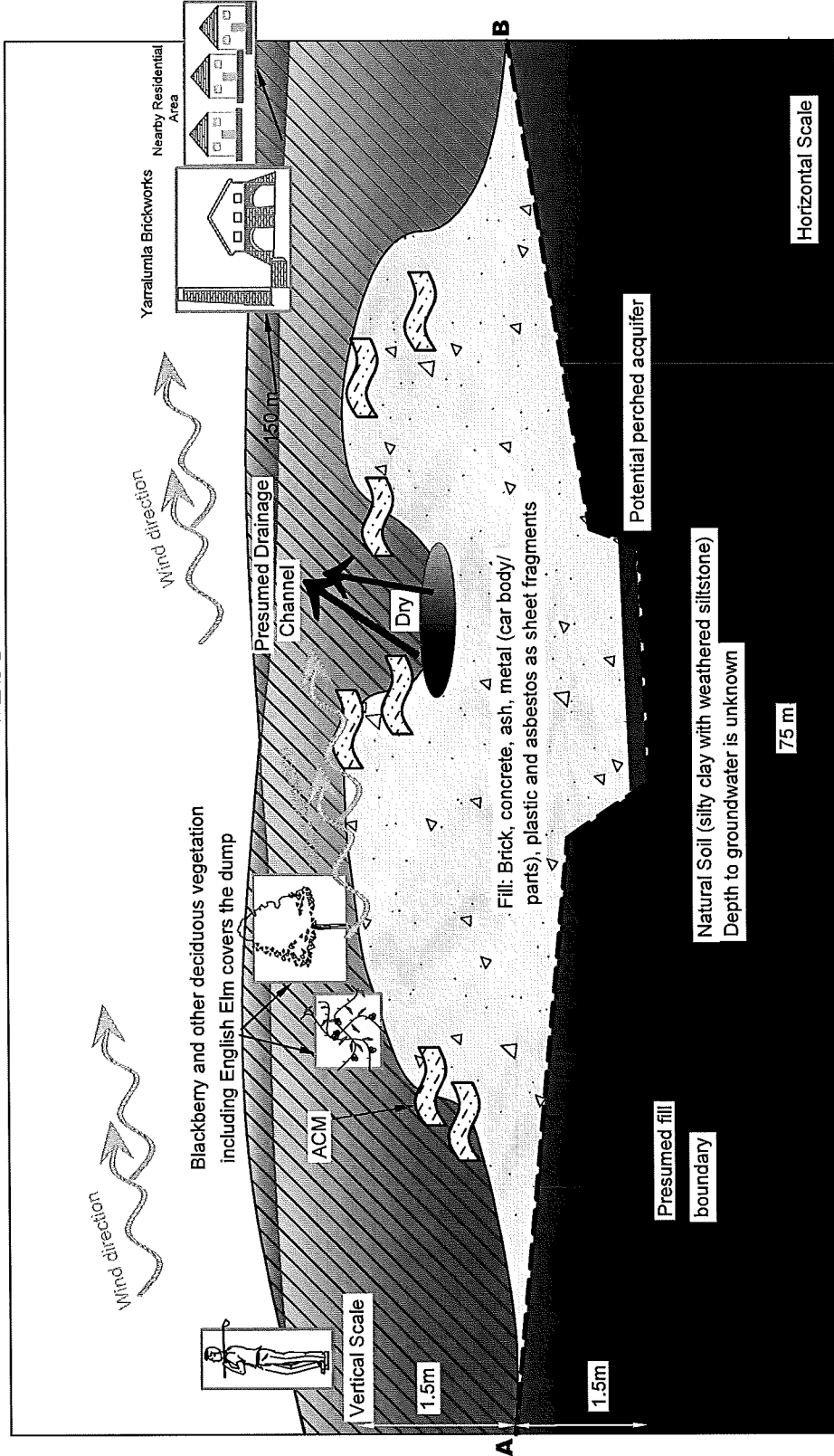
Location: CANBERRA BRICKWORKS (AREA OF CONCERN) (BLOCKS 1 & 20 SECTION 102 AND BLOCK 1 SECTION 127) YARRAGUNGA ACT 2600

Drawing Title:
SITE PLAN

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Checked B.K.	Signed <i>[Signature]</i>	Date 17.03.2014
Rev A	Date 17.03.2014	Revision Details
Dim	S.W.	Figure No. Rev.
9623	Project - Drawing No.	2 A

Royal Canberra Golf Course




WEST



CROSS SECTION OF ASBESTOS DUMP



LEGEND

-  ACM - Asbestos Containing Material
-  Possible Receptors
-  Open space/Golf Course beyond

Note: Scale, locations, and boundaries are approximate only.



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CAPEZIO AND CO
 (ACT Property Group)

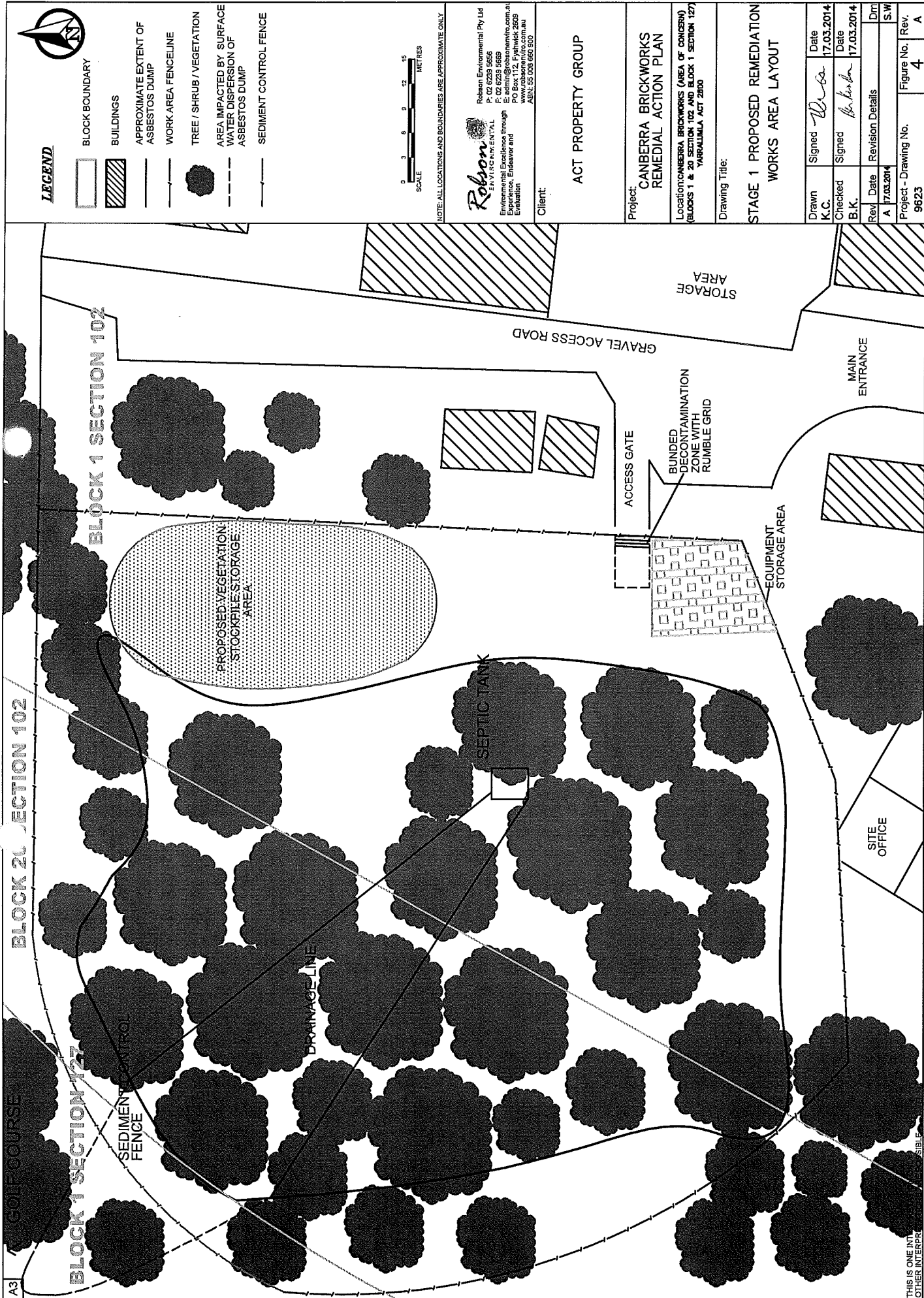
Project: CANNBERRA BRICKWORKS
 RAP

Location: CANNBERRA BRICKWORKS (AREA OF CONCERN)
 (BLOCKS 1 & 20 SECTION 102 AND BLOCK 1 SECTION 127)
 YARRALUMLA ACT 2600

Drawing Title:

CONCEPTUAL SITE MODEL

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Checked B.K.	Signed	Date
Rev A	Date	Rev.
Revision Details		Figure No.
Project - Drawing No.		3
9623		A



LEGEND

- BLOCK BOUNDARY
- BUILDINGS
- APPROXIMATE EXTENT OF ASBESTOS DUMP
- WORK AREA FENCELINE
- TREE / SHRUB / VEGETATION
- AREA IMPACTED BY SURFACE WATER DISPERSION OF ASBESTOS DUMP
- SEDIMENT CONTROL FENCE



NOTE: ALL LOCATIONS AND BOUNDARIES ARE APPROXIMATE ONLY.

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Project:
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 REMEDIAL ACTION PLAN**

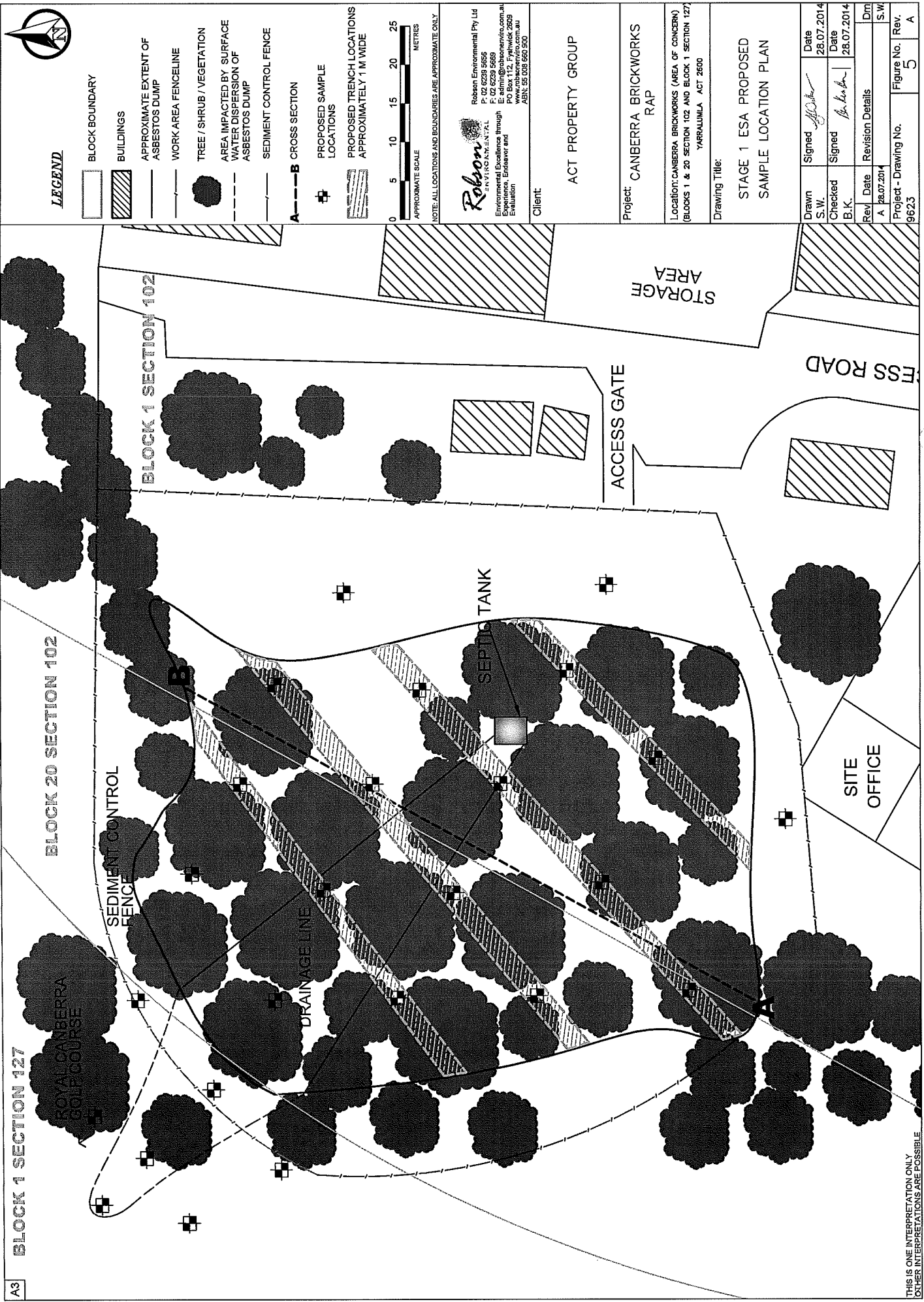
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 (BLOCKS 1 & 20 SECTION 102, BLOCK 1 SECTION 101)
 YARRAGAMBA ACT 2508

Drawing Title:

**STAGE 1 PROPOSED REMEDIATION
 WORKS AREA LAYOUT**

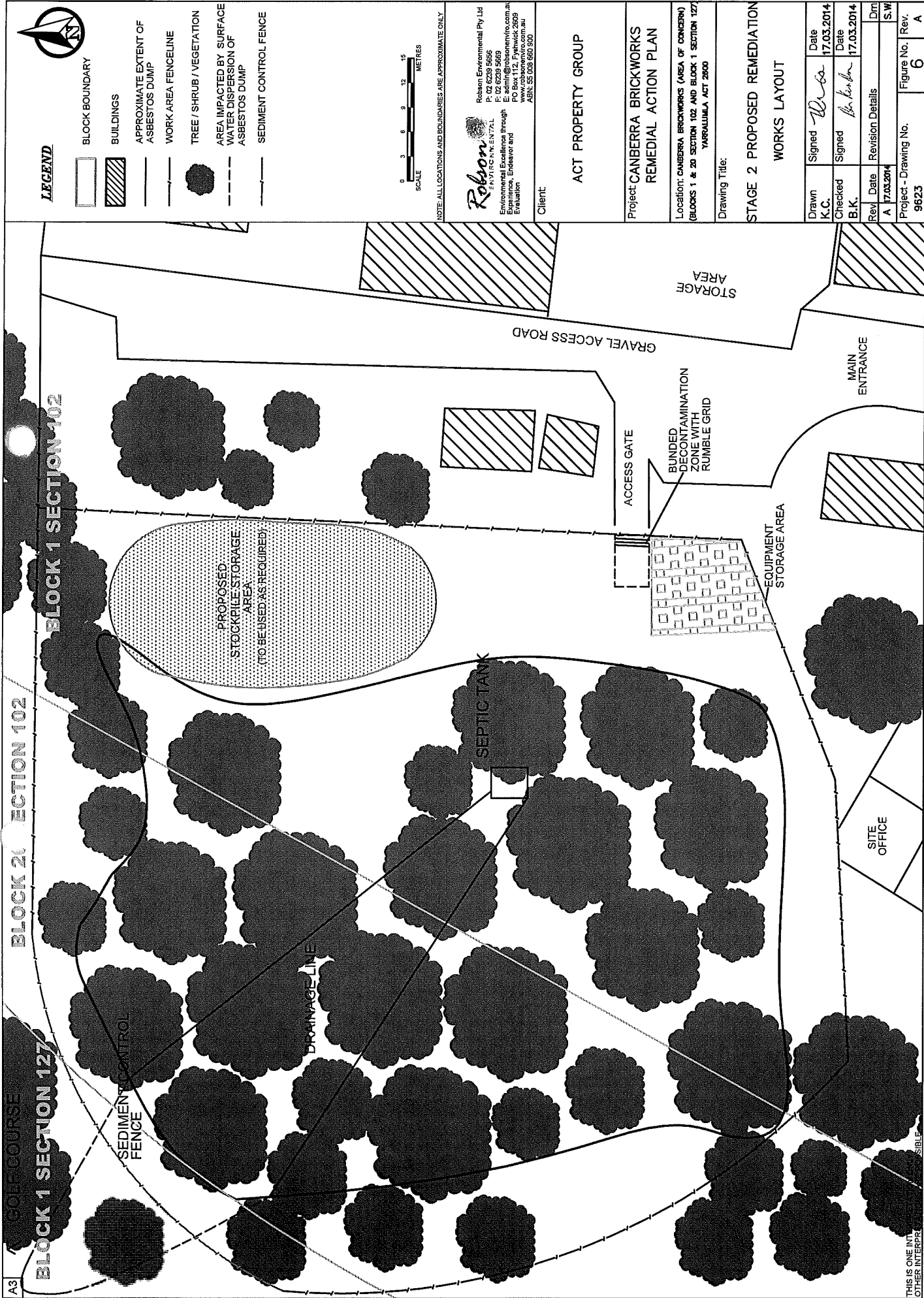
Drawn K.C.	Signed <i>[Signature]</i>	Date 17.03.2014
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Rev A	Date 17.03.2014	Revision Details
Project - Drawing No. 9623		Figure No. Rev. 4 A

THIS IS ONE INTENT ONLY. OTHER INTERPRETATIONS ARE NOT PERMITTED.



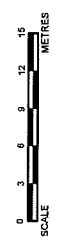
A3 BLOCK 1 SECTION 127

THIS IS ONE INTERPRETATION ONLY
OTHER INTERPRETATIONS ARE POSSIBLE



LEGEND

- BLOCK BOUNDARY
- BUILDINGS
- APPROXIMATE EXTENT OF ASBESTOS DUMP
- WORK AREA FENCELINE
- TREE / SHRUB / VEGETATION
- AREA IMPACTED BY SURFACE WATER DISPERSION OF ASBESTOS DUMP
- SEDIMENT CONTROL FENCE



NOTE: ALL LOCATIONS AND BOUNDARIES ARE APPROXIMATE ONLY.

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Project: CANNBERRA BRICKWORKS
 REMEDIAL ACTION PLAN

Location: CANNBERRA BRICKWORKS (AREA OF CONCERN)
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Drawing Title:
 STAGE 2 PROPOSED REMEDIATION
 WORKS LAYOUT

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Rev A	Date 17.03.2014	Revision Details
Project - Drawing No. 9623		Figure No. Rev. 6 A

THIS IS ONE INTENT
 OTHER INTERPRETATIONS

APPENDICES



Appendix A

Zoning Information

RZ1 – Suburban zone development table

EXEMPT DEVELOPMENT	
Development approval is not required. Building approval may be required. On leased land, development must be authorised by a lease.	
Single dwelling housing – new residential land, subject to section 20 and schedule 1 of the Planning and Development Regulation 2008.	
Exempt development identified in section 20 and schedule 1 of the Planning and Development Regulation 2008.	
ASSESSABLE DEVELOPMENT	
Development application required. On leased land, development must be authorised by a lease.	
MINIMUM ASSESSMENT TRACK CODE	
Development application required and assessed in the code track	
Development	
Single dwelling housing that complies with the relevant rules, except where exempted from requiring development approval by section 20 and schedule 1 of the Planning and Development Regulation 2008.	
Varying a lease to do one or more of the following:	
<ol style="list-style-type: none"> 1. express the number of approved or lawfully erected dwellings 2. remove, relocate or change easements. 	
Development specified as additional code track development in a suburb precinct code for land shown on the relevant suburb precinct map	
MINIMUM ASSESSMENT TRACK MERIT	
Development application required and assessed in the merit track, unless specified in schedule 4 of the Planning and Development Act 2007 (as impact track)	
Development	
ancillary use	parkland
boarding house	residential care accommodation
child care centre	retirement village
community activity centre	sign
consolidation	single dwelling housing (where not exempt development or code track assessable)
demolition	secondary residence
development specified as additional merit track development in a suburb precinct code for land shown on the relevant suburb precinct map	special dwelling
guest house	subdivision
health facility	supportive housing
home business	temporary use
minor use	varying a lease (where not code track or impact track assessable)
multi-unit housing	
MINIMUM ASSESSMENT TRACK IMPACT	
Development application required and assessed in the impact track	
1. Development that is not an exempt, code track or merit track development (see section 134 of the Planning and Development Act 2007).	
2. Development specified in schedule 4 of the Planning and Development Act 2007 and not listed as a prohibited use in this table.	
3. Development that is authorised by a lease and listed as a prohibited use in this table.	

CZ6 – Leisure and Accommodation Zone Development Table

EXEMPT DEVELOPMENT	
Development approval is not required. Building approval may be required. On leased land, development must be authorised by a lease.	
Development identified in the Planning and Development Act 2007 as exempt (see sections 133 and 134 of the Act and section 20 and schedule 1 of the Planning and Development Regulation 2008)	
ASSESSABLE DEVELOPMENT	
Development application required. On leased land, development must be authorised by a lease.	
MINIMUM ASSESSMENT TRACK CODE	
Development listed below requires a development application and is assessed in the code track	
Development	
No development identified	
MINIMUM ASSESSMENT TRACK MERIT	
Development listed below requires a development application and is assessed in the merit track, unless specified in schedule 4 of the Planning and Development Act 2007 (as impact track) or specified as prohibited development in a precinct map.	
Development	
ancillary use	minor road
aquatic recreation facility	minor use
car park	outdoor recreation facility
caravan park/camping ground	overnight camping area
club	parkland
COMMERCIAL ACCOMMODATION USE	pedestrian plaza
COMMUNITY USE	place of assembly
consolidation	public agency
craft workshop	public transport facility
demolition	restaurant
development in a location and of a type identified in a precinct map as additional merit track development	SHOP
drink establishment	sign
drive-in cinema	subdivision
group or organised camp	temporary use
indoor entertainment facility	tourist facility
indoor recreation facility	zoological facility
MINIMUM ASSESSMENT TRACK IMPACT	
Development listed below requires a development application and is assessed in the impact track	
1. Development that is not: <ul style="list-style-type: none"> a. Exempt code track or merit track development; or b. Prohibited development other than development that is permitted under s137 of the Planning and Development Act 2007. 	
2. Development specified in schedule 4 of the Planning and Development Act 2007 and not listed as a prohibited use in this table.	
3. Development that is authorised by a lease and listed as a prohibited use in this table.	
4. Development declared under section 124 or section 125 of the Planning and Development Act 2007 and not listed as a prohibited development in this table.	
5. Varying a lease to add a use assessable under the impact track.	

Appendix B Photographs

Photographs – February 2013



Photograph 1: View of the asbestos dump ('AD') covered with blackberry vine.



Photograph 2: View of vegetated 'AD' from the east side.



Photograph 3: General view of asbestos sheet waste in the 'AD'.



Photograph 4: Sheet waste in soil.



Photograph 5: View of 'AD' from the north.



Photograph 6: View of dumped concrete.



Photograph 7: General view of old septic tank in the 'AD'.

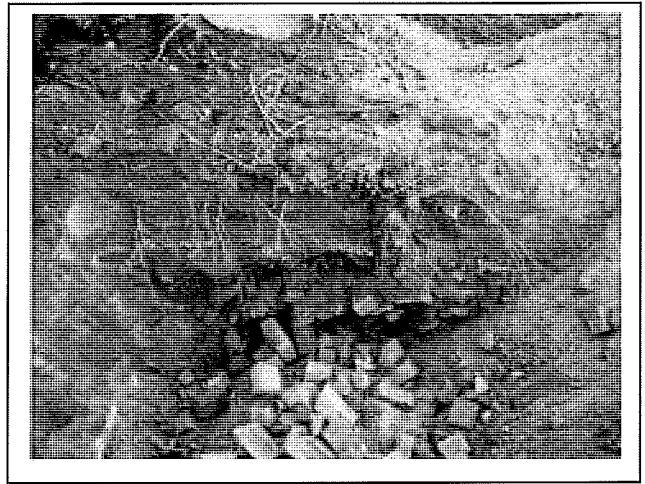


Photograph 8: Septic tank in the 'AD'.

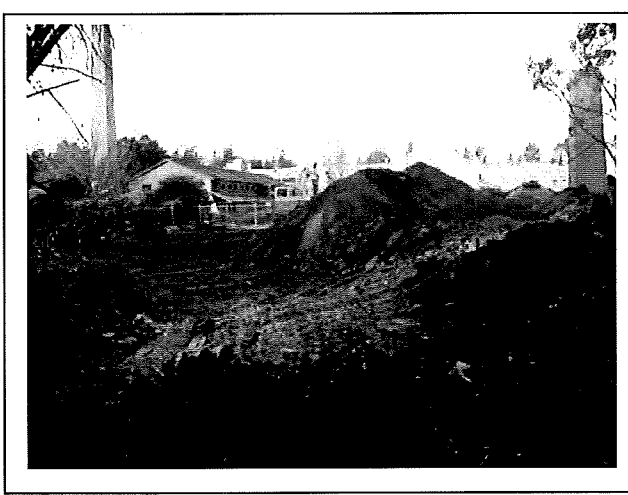
Photographs – June 2007



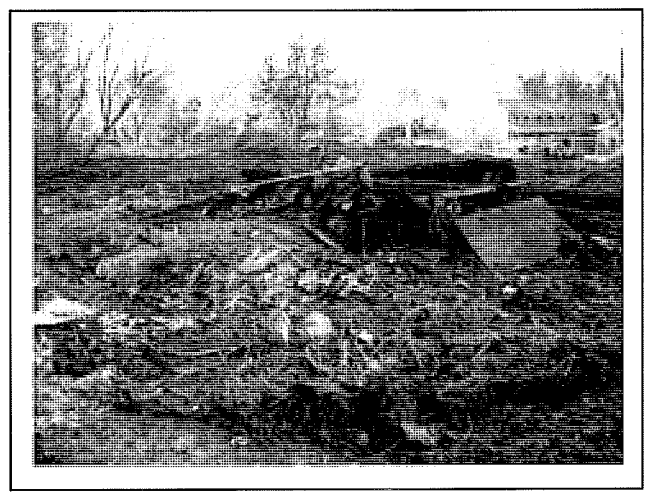
Photograph 9: View of 'AD' following removal of vegetation in June 2007.



Photograph 10: View of typical layers within the 'AD' (June 2007).



Photograph 11: General view to the east during remediation in June 2007.



Photograph 12: View of asbestos waste within the 'AD' in June 2007.

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Appendix C

Work Method Statements

Airborne Fibre Monitoring

Airborne Fibre Monitoring must be undertaken at all stage of remedial works on site by an Class A Asbestos Assessor in accordance with the NOHSC 'Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Dust' (NOHSC: 3003, 2005) for both exposure and control sampling.

Air monitoring locations will include the site perimeter, decontamination zones, lunchroom and cabins of representative plant equipment and will be monitored on a daily basis.

As discussed in **Section 4.5.4** of this document, the control level for airborne fibre concentrations recorded during air monitoring will be 0.01 fibres/mL (f/mL). Based on the premise that exposure to asbestos fibres during removal works should be minimised for both workers and the public, Robson has adopted the 'control levels' as set out in NOHSC 2002 (2005) 'Code of Practice for the Safe Removal of Asbestos – 2nd Edition' and summarised below in the table below..

Air Monitoring Control Levels

Control Levels (airborne asbestos f/mL)	Control / Action
< 0.01 f/ml	Continue with control measures
≥ 0.01 f/ml	Stop work and review control measures
≥ 0.02 f/ml	Stop work and find cause (for example lack of water, wind strength)

Plant Operators

As general Site rule all plant operators must enter and exit their vehicles within the decontamination zone only and while working the windows to their cabins must be closed and the cabins placed under positive pressure to prevent the ingress of unfiltered air.

Vegetation Removal

Work Method Statement for the removal of Blackberry vines and other vegetation that obscure the extent of the Asbestos Dump.

In accordance with blackberry removal practices as undertaken by Parks, Conservation and Land the civil contractor shall implement the following:

Site Set Up

1. Define appropriate storage area.
2. Due to the potential asbestos hazard ensure all machine operators and other personnel must be provided with the P2 respirators and coveralls, are comfortable with wearing them and understand the risks of working in the proximity to asbestos.
3. Ensure an ACT licensed asbestos removalist is available on site at all times to facilitate the removal of the asbestos hazard as required. This may include the removal of asbestos waste or simply ensuring the area is kept moist with a fine water mist.

Removal Works

1. Removal of blackberry and other vegetation to facilitate access to the waste. The vegetation will be removed with an appropriate machine and stockpiled in the designated removal area. Blackberry vine may be disposed of as green waste in the ACT.
2. In the case where an asbestos hazard must be removed the work will cease until the asbestos has been removed.
3. All trees that inhibit the remediation may be removed in consultation with the environmental scientist and the tree management plan specific to this project.

Asbestos Sheet and Impacted Soil Removal

Work Method Statement for the removal of Bonded Asbestos Sheet Materials from the Asbestos Dump.

Following the removal of the vegetation cover and as the Asbestos materials become accessible removal may commence.

All asbestos materials must be removed and transported by an ACT licensed asbestos removalist in accordance with the following Guidelines:

- *Safe Removal of Asbestos Code of Practice 2nd Edition <NOHSC: 2002 (2005); and*
- *ACT ESDD (2014) 'Information Sheet 5 Requirements for the transport and disposal of asbestos contaminated wastes';*

The movement of the asbestos waste must be conducted under the following conditions:

Storage area set up adjacent removal area

1. Cordon off designated area and fix appropriate signage.

e.g. ASBESTOS HAZARD
Contact the Site Supervisor before entering this site.
2. Based on the volume of material identified the sheeting may either be hand picked and placed in plastic asbestos bags for disposal or larger volumes may need to be placed directly into a doubled lined (200 micron thick plastic) metal container.
3. In the case that asbestos contaminated soil is identified this soil may either be loaded directly into leak proof trucks with suitable dust covers for transport to a suitably licensed landfill. If the material has to be stored on site the base of the stockpile areas will need to be lined with a layers of 200 micron thick plastic and the stockpiles covered with plastic if they are to be left overnight.
4. Ensure the storage area has been inspected and approved by an ACT Class 'A' Asbestos Assessor prior to their use.

Removal Works

1. PPE must be worn; P2 respirators, disposable overalls, gloves, hearing protection (as necessary).
2. A fine water mist is to be sprayed over the area during the removal of the asbestos waste.
3. The transport vehicle and storage containers must be leak proof and equipped with a secured dust cover. Plastic lining is only required for skip bins / storage containers.
4. Air monitoring will be required at all times. All air monitoring results will be forwarded to all Stakeholders prior to the commencement of work the next day.
5. In the event that high fibre concentrations exceed the action level of 0.01 fibres/ml all work must stop and the removal method reviewed.

On Completion

1. All machinery and trucks must be decontaminated immediately following completion of all work on the contaminated site.
2. All waste plastic and disposable coveralls must be disposed of as asbestos waste.
3. All areas affected by the asbestos dump and storage areas, must be visually cleared and validated (soil sampling) by an ACT Class 'A' Asbestos Assessor and a Clearance Certificate issued.

Appendix D

***ACT ESDD (2014) 'Information Sheet 5 Requirements
for the transport and disposal of asbestos
contaminated wastes'***



ACT
Government

Environment and
Sustainable Development

CONTAMINATED SITES • FEBRUARY 2014



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Information sheet 5 – Requirements for the transport and disposal of asbestos contaminated wastes*

The provisions below apply to any activity that involves the transportation, collection, storage, or disposal of any type of asbestos waste, regardless of whether the activity is required to be licensed.

Transportation requirements for asbestos waste are:

- Any type of asbestos waste must not be transported unless it is conveyed in a covered leak proof vehicle so as to prevent any spillage or dispersal of the waste.
- If asbestos waste that is in the form of stabilised asbestos waste in bonded matrix is to be transported and the waste is not stored in a bag in accordance with the requirements for collection and storage (see below), the waste must be wetted before it is transported.
- Any vehicle used to transport any type of asbestos waste must be cleaned before leaving the landfill site at which the waste is disposed of, so as to ensure that all residual asbestos waste is removed from the vehicle.

Collection and storage requirements for asbestos waste are:

- Asbestos waste that is in the form of asbestos fibre and dust waste must be covered in such a manner as to prevent the emission of any dust.
- Asbestos waste that is in the form of asbestos fibre and dust waste must not be collected and stored except in accordance with the following procedures:
 - the waste must be collected and stored in impermeable bags
 - each bag must be made of heavy duty low density polyethylene of at least 0.2mm thickness, and have dimensions of no more than 1.2 metre in height and 0.9 metre in width
 - each bag must be sealed in accordance with the NOHSC Code of Practice for the Safe Removal Of Asbestos 2nd Edition guidelines, and contain no more than 25kg of waste and
 - each bag must be marked with the words 'CAUTION ASBESTOS' in letters that are of not less than 40mm and that comply with Australian Standard AS 1319— *Safety Signs for the Occupational Environment*.

- If asbestos waste in any form is stored in a bag, the following procedures must be followed:
 - the bag must be placed in a leak proof container that is used only for the purposes of storing asbestos waste
 - the container must be marked with the words 'DANGER-ASBESTOS WASTE ONLY— AVOID CREATING DUST' in letters that are of not less than 50mm and that comply with Australian Standard referred to in paragraph above and
 - the container must have a close fitting sealed cover so as to prevent any spillage or dispersal of the waste.
- Asbestos waste in any form must not be stored except in accordance with the following procedures:
 - the waste must be stored in a secure area so as to prevent entry by unauthorised persons and to prevent the risk of environmental harm and
 - the waste must, if it is practicable to do so, be stored separately from other types of waste.
- If asbestos waste that is in the form of stabilised asbestos waste in bonded matrix is stored otherwise than in a bag (as detailed above), the following procedures must be followed:
 - if it is practicable to do so, the waste must be wetted so as to prevent the emission of any dust
 - in wetting the asbestos waste, care must be taken to ensure that the wetting process does not cause any emission of dust or lead to any discharge of polluted water and
 - the waste must be kept covered at all times.

Disposal requirements for asbestos waste are as follows:

- Asbestos waste in any form must be disposed of only at a landfill site that may lawfully receive the waste.
- Disposal of asbestos waste in any form must be by way of burial.
- Before disposal of the asbestos waste, arrangements must be made with the occupier of the landfill site for the purposes of ensuring that the asbestos waste will be covered:



- initially to a depth of at least 0.5 metre, and
- finally to a depth of at least 1 metre (in the case of stabilised asbestos waste in bonded matrix) or 3 metres (in the case of asbestos fibre and dust waste) beneath the planned final land surface of the landfill site.
- The asbestos waste must:
 - be disposed of in accordance with the arrangements in the paragraph above and
 - be buried to the initial depth on the same day it is received at the landfill site.
- In disposing of asbestos waste in any form at a landfill site, the waste must:
 - be unloaded in such a manner as to avoid the creation of dust
 - not be compacted before it is covered and
 - not come into contact with any earthmoving equipment at any time.

This Information Sheet prohibits the use of asbestos waste in any form as road making material.

* Information reproduced in part from the Environmental Guidelines: Assessment, Classification & Management of Liquid & Non-liquid Wastes, Storing, handling, transporting and disposing of asbestos wastes, NSW EPA

For more information

Contact the Environment Protection Authority by calling Canberra Connect on 13 22 81.

Go to environment.act.gov.au for more information relating to Environment Protection

- [Contaminated Land](#)



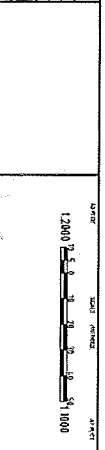
Appendix E

Control Plans

(Site and Sediment and Erosion Control)

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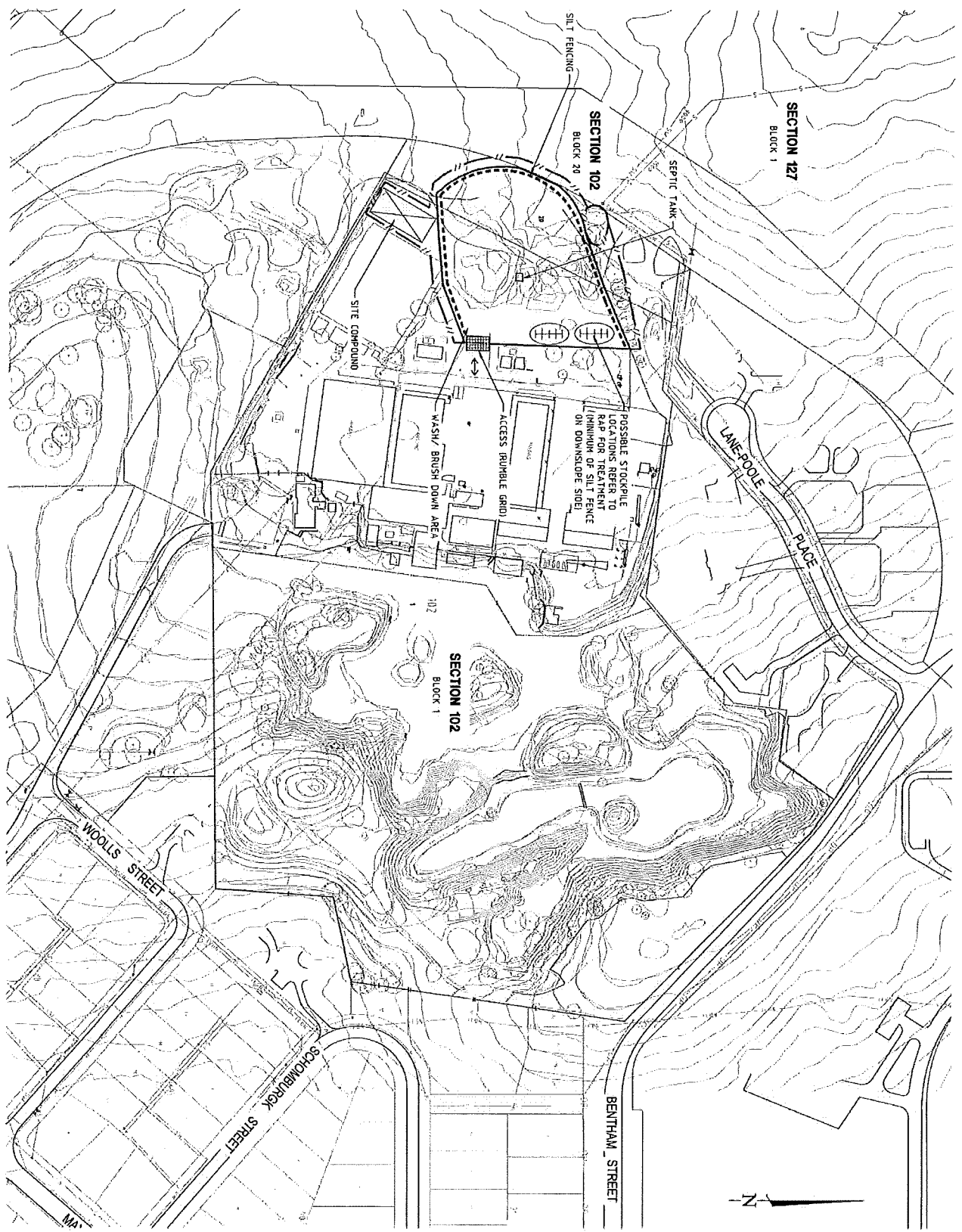
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ACT Shared Services (Precedent)
 CANBERRA BRICKWORKS
 SEDIMENTATION PROJECT

BROWN
 www.browncivil.com.au

PROJECT: **SEDIMENT EROSION CONTROL PLAN**
 DRAWING NO: **C14002-006+**



- NOTES**
1. RUMBLE GRID TO BE INSTALLED AT ENTRANCE/EXIT TO SITE
 2. GRAVEL (ROGEE) HARDSTAND TO BE INSTALLED EITHER SIDE OF ACCESS GATE
 3. SEDIMENT MEASURES FOR WASH DOWN/BRUSH DOWN AREA FOR TRUCKS DISCUSSED IN RAP
- LEGEND**
- REFER TO DRAWING C14002-004+ FOR LEGEND

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Mr Clinton Smith
Detective Constable 10848
TIG Response Team 3

Dear Mr Smith

Information required for Coronial Inquest – Fire in Yarralumla

Please find attached information relating to the fire at the Yarralumla Brickworks on 29 December 2005. The Territory and Municipal Services Department has attached information from all areas involved in the fire specifically the Property Branch and land management functions.

- Part one is the questions directed to me relevant to my role in the Bushfire Management Unit; and
- Part two is information relevant to the questions directed to Karen White in Property Group.

If you have any further inquiries please contact me 6207 5452.

Ross Burden
Bushfire Management Unit
Territories and Municipal Services

September 2006

Information relating to land management at the Brickworks site in Yarralumla

You requested the following information from Ross Burden:

- what management and maintenance were done in the relation to managing possible future fire events? It may be prudent to mention the terrain of the site and how this may or may not have affected maintenance.
- As discussed could you outline what measures were taken on the site prior to Thursday 29 December 2005? Could explain why the site is not governed by the 'Strategic Bushfire Management Plan for the ACT'? Further more could you explain which surrounding areas are managed according to this plan and what action had been carried out because of this?
- In regards to the maintenance that is carried out are you able to explain what affect it would have should a fire event occur, i.e. does it provide any prevention of spread or does it make it more manageable?
- Please include any information that I have not queried here but you believe may be relevant to the inquiry.
- I appreciate any information you are able to supply me with for presentation to the coroner. If there is any documentation available in support of you information could you please submit as an annexure to any reports that you complete.

The Site

Located in the district of Canberra Central, Division of Yarralumla, Block 1, Section 102. The Brickworks and its brickpits (quarry) are located on the western edge of the suburb, Yarralumla.

The Brickworks Block 1/102 Yarralumla comprise of a heritage landscape where the remaining buildings, structures, equipment and landscape features demonstrate a range of industrial processes associated with tile, brick and clay production over a 60 year period. The site is 9.6 hectares, is managed by the ACT Government and access to the site is via Denman Street.

The brickpits and quarry site have historical value as a primary source of clay and are also of considerable geological value as the type locality for the 'Yarralumla Formation', dating from the Silurian Period 425 million years ago. The Brickworks and quarry site has been placed on the Heritage Register for the ACT.

ACT Heritage council has agreed that the quarry landform should be retained in a manner whereby it is clearly evident to be a man made excavation, associated with the industrial use of the site. The shape of the quarry may be altered in a minor manner, however access points into and out of the quarry area should utilise existing openings and gradients within the landform.

Property Branch of the Department of Territories and Municipal Services manages the brickworks and quarry site. The landscape maintenance in the quarry site is contracted out to Parks, Conservation and Lands, (old Parks and Places) who undertakes herbicide application and instructing the subcontract Pastures Rural when mowing is require to the site. The quarry site is fenced off from general public access.

Strategic Bushfire Management Plan Maintenance standards

Bushfire risk cannot be eliminated altogether but can be reduced by managing fuels in and near the boundaries of residential properties. This can be achieved by reducing ground and near surface fuels through regular slashing programs, lifting tree branches to remove ladder fuels, control woody weeds and when the fuels loads build up again undertake controlled burns.

Following January 2003 bushfires and Ron McLeod Inquiry in to the operational response into the bushfires, the ACT Government develop a Strategic Bushfire management Plan which is a sustainable ten year solution to the challenges of managing bushfires in the ACT. It establishes the framework for the efficient, effective and comprehensive management of fire and fire related activities for the protection of human life, property, assets and the environment. The overall strategic objective is to minimise the likelihood of bushfires and their consequences. Specific standards relevant to the Brickworks site include the Inner and Outer asset protection zones.

The purpose of the Inner Asset Protection Zone is to reduce fire intensity, ember load and the likelihood of crown fires to reduce the probability of asset damage and provide a defensible space for residents and emergency service personnel to protect property. Located adjacent to urban edge its width is variable, from 10 to 30m wide out from residential boundary.

The reduction of fuel in the Outer Asset Protection Zone will substantially decrease the intensity of an approaching fire and restrict the pathway to crown fuels, reducing the level of direct flame, radiant heat and ember attack on the Inner Asset Protection Zone. Location is typically abutting assets to the north and west or surrounding assets of very high vulnerability. Urban edge Outer Asset Protection Zone extends from 0 - 300m wide.

In addition to the SBMP is urban edge zoning. The Urban edge zoning identifies areas most at risk by a major fire event that has more than a 250 metres fire run. On the attached map a red edge is primary (North West exposure), secondary edge orange (South west exposure) and lee edge yellow (south east exposure). This assists in determining the widths of fuel management in the Inner APZ at the 10 – 30 metre fuel reduced zones.

The urban edge zones were classified around the edge of the Brickworks and quarry with the aim of protecting this asset. However the treatment within the quarry site and especially along the residential edge was also performed to the Inner asset protection zone standard wherever possible, given the limitations of the quarry steep slopes. (refer to annexure 1 for North and South maps), (Annexure 2 Copy of Strategic Bushfire Management Plan)

Onsite maintenance

The Brickworks Block 1/102 Yarralumla topography is relative flat at the base and on the top of the quarry with steep quarry rock faces. The majority of the top areas in the quarry is dominated by pines trees, with the base of the quarry dominated by grass.

The edge firebreaks are mown every six to eight during the growing season or when the grass height exceeded 300mm in height. These areas include the fence line running parallel to Denman Street and from Denman Street through to Banks Street bordering Woolls St and Schomburgk St. (refer to Annexure 3 for copy of an email agreement between Property and Parks and Places re mowing, confirmed by work order issued on 10/05/05 at Annexure 4.3)

The contractor mowed the edge firebreak on the 19 November 2005 and then again on 9 December 2005 on request of the Property Branch. Due to the slope and shale rock areas, some sections are inaccessible, fuel loads on these areas were low with sparse cover of mustard weed and juvenile blackberries. All areas that could be mown, taking into account safety of the operator and machinery, were completed to a high standard, the mown grass height was at 100mm.

Additional mowing was also undertaken on Friday the 9 December 2005 to the area in-between the quarry (first row of trees 30 metres wide and 80 metres long) and the brickwork's buildings on the eastern side. (refer to Annexure 4 for copy of Email requests and invoices showing works that were undertaken)

The Brickworks is used by one major tenant, Thor's Hammer, plus a number of artist groups. Thor's Hammer lease requires them to maintain and mow the areas directly adjacent to the brickworks buildings.

Public correspondence relating to onsite maintenance

Since 2002 the following issues have been raised with the Department:

A representation was made by [REDACTED] on 23 September 2002 [REDACTED] complaining that the area around their complex had overgrown blackberries as well as grass and shrubs which could pose a fire hazard and were an eyesore. The Minister for Urban Services wrote back advising that appropriate action was being taken to attend to his concerns.

By November 2002 grass slashing was complete and a bulldozer had been utilized to remove blackberry bushes in and outside the Brickworks. Regrowth was sprayed in mid March 2003.

Following the bushfires of January 2003, [REDACTED] raised concerns about pine trees along the boundaries of the Brickworks and area adjacent to their properties. Residents were advised that the ACT Fire Brigade inspected the site on 18 March 2003 and advised that the trees in question did not pose any fire hazard.

[REDACTED] 17 August 2003, again on behalf of the [REDACTED] complaining that the poisoned blackberries on adjacent unleased land near the entrance to the Brickworks posed a fire hazard. This ministerial was referred to ACTPLA for response as it was the custodian of the land in question at that time.

A representation was made by [REDACTED] on 8 October 2003 on behalf of the [REDACTED] complaining that the timber stored on the Brickworks site could pose a fire hazard. The response to [REDACTED] advised of an inspection conducted by ACT Fire Brigade that deemed the area not to be a fire hazard and that the ACT Fire Brigade would continue to monitor the situation during the summer months. In addition Property Branch was arranging grass slashing and a fuel reduction program during November 2003.

A further representation from [REDACTED] on 21 January 2004 on behalf of [REDACTED] raised concerns that the surrounding undergrowth, blackberries and trees were creating a fire hazard. Mr Bowditch was advised of fire hazard reduction measures completed in December 2003, which included felling of trees and removal of woody weeds along Lane Poole Place boundary with the Brickworks. He was again advised that the ACT Fire Brigade was continuing to monitor the site during the summer months.

Property Branch had undertaken significant tree reduction along the residential boundaries of Woolis, Schomburgk, and Bentham Streets and Lane Poole Place. It had established a 15 metre urban space buffer from the residential boundaries. The cost of the project was \$17,200. The program had occurred after all adjacent residents were consulted about the program. While most supported the work being done, there were some residents that wanted trees along boundaries near their homes to be left alone.

The Government received a representation from [REDACTED] on 17 November 2005. It was written on behalf of the Body Corporate of [REDACTED] and complained that due to recent rains, the grass and shrubs in the Brickworks had grown extensively. Parks and Places responded in January 2006 by advising of the maintenance program in place for the site and provided dates of mowing undertaken on the site over the latter part of 2005, including the most recent on 9 December.

Outside Maintenance

The areas directly outside of the Brickworks and quarry site complex are mown every six to eight during the growing season or when the grass height exceeded 300mm in height. (a copy of SLA agreements between Canberra Urban Parks and Places and Cityscape can be provided if requested, showing mowing standards)

Mowing outside the fence line of the brickworks on block 7/102 was undertaken on the 22 December 2005, and the area of mowing far out reaches both the Inner and outer asset protection zones. The area was mown up to 3 times prior to 22 December cut. (refer to Annexure 5 for copy fax showing works that were undertaken)

5A3

Public correspondence relating to offsite maintenance

██████████ made a further representation on 19 October 2004 on behalf of the ██████████
██████████ He complained that in the area adjoining the Brickworks there were
dead trees, shrubs, blackberry bushes posing a fire hazard and eyesore. He was advised
that although the area in question was outside the Brickworks and was therefore the
responsibility of ACTPLA, Property would contact relevant ACTPLA officers to ensure the
area was cleaned up.

Until this financial year ACTPLA retained the custodianship of vast areas of urban unleased
land in Canberra including some land adjacent to the Brickworks. It transferred
custodianship of this land to Parks and Places at the start of the financial year. Mowing of
the sites were undertaken.

Details of Annexure

Annex 1

- Maps of North and South Canberra showing Urban Edge Zoning.

Annex 2

- Copy of Strategic Bushfire Management Plan

Annex 3

- Copy of email and work order which forms agreement on mowing between
Property and Parks and Places.

Annex 4

1. Email; dated 2 march 2005
Property Branch agree to quote and discuss retention of trees
2. Letter; dated 4 April 2005
Pastures Rural Centre quote for mowing and spraying
3. Fax; dated 10 May 2005
Agreement to Cityscape quote to mow 6 times per year and annual weed
spraying, to commence 1 July 2005.
4. Invoice; dated 6 September 2005
Works undertaken 6 September 2005.
5. Invoice; dated 6 September 2005
Second invoice for same mowing period.
6. Email; dated 21 November 2005
Pastures Rural Contractors confirming they mowed the brickworks area on 19
November 2005.
7. Invoice; dated 19 November 2005
Mowing invoice for 19 Nov mow
8. Email; dated 6 December 2005
Request for mowing from Property Branch to Parks and Places of the Brickworks
site.
9. Invoice; dated 9 December 2005
Invoice for mowing on the 9 December 2005
10. Email; dated 30 December
S. Pittard explaining the mowing regime and what was mown in the Brickworks
complex prior to the fire.

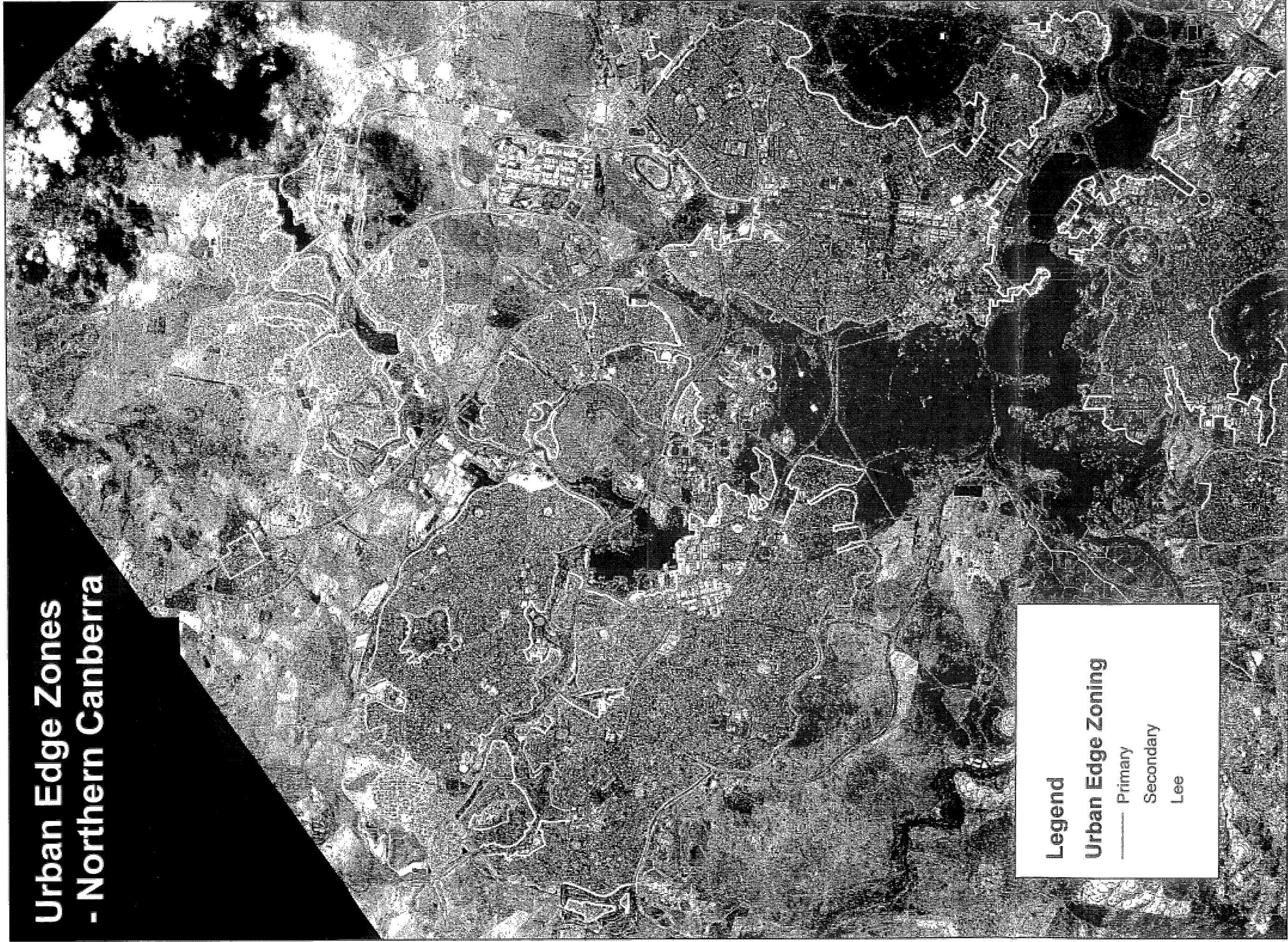
Annex 5

- Fax; dated 30 December 2005
Copy of time sheet for mowing showing a mow outside the brickworks on 22 December 2005 by Parks and Places.

TAMS Officers where further information can be obtained include:

Name	Position	Contact Number
Ross Burden	Manager, Parks and Places Bushfire Unit	6207 5452
Karen White	Assistance Manager, Owned and Leased buildings, Property Branch	6205 2889
Scott Pittard	Clients Projects Supervisor	6207 5435
Peter Breust	Operations Supervisor – Inner South	6207 2822

Urban Edge Zones - Northern Canberra

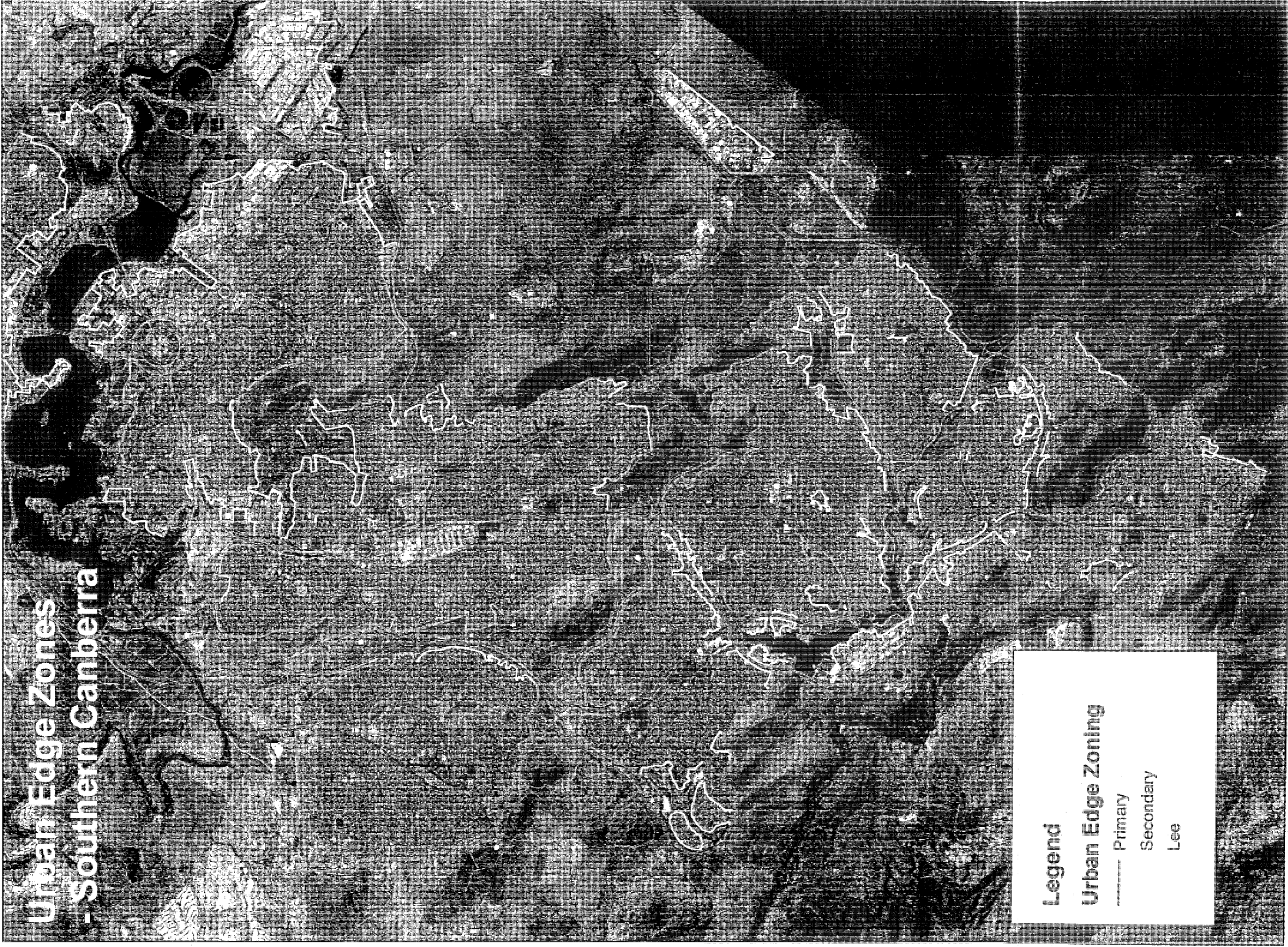


Legend

Urban Edge Zoning

- Primary
- Secondary
- Lee

**Urban Edge Zones
- Southern Canberra**



Legend

Urban Edge Zoning

- Primary
- Secondary
- Lee

Strategic Bushfire Management Plan for the ACT

Version 1

January 2005



Working in partnership to protect and preserve life, property and the environment in the ACT



Rolfe, Darren

From: Rolfe, Darren
Sent: Tuesday, 10 May 2005 4:33 PM
To: [REDACTED]
Subject: RE: Yarra brickworks mowing

[REDACTED]

Please be advised that I have sent a fax attention to you advising you to proceed with the maintenance program for the Yarralumla Brickworks, the fax advises of details. Please let me know should you require more information.

Regards
Darren.

-----Original Message-----

From: Pittard, Scott
Sent: Monday, 4 April 2005 3:10 PM
To: Rolfe, Darren
Subject: RE: Yarra brickworks mowing

Darren,
Having further inspected the area concerned , I believe we can significantly reduce the price for maintenance as detailed below. This reduction is due to the area remaining clean and tidy, therefore taking less time to perform the necessary works.
The revised price is [REDACTED] exclusive for the 6 mows per year and one spray of noxious weeds in December.
I hope this has been of assistance.

Ta

[REDACTED]

-----Original Message-----

From: Rolfe, Darren
Sent: Monday, 4 April 2005 8:36 AM
To: [REDACTED]
Subject: RE: Yarra brickworks mowing

Rene,

Quote for Yarralumla Brickworks is as follows -

1 mow every 2 months and one poison spray in December - cost is [REDACTED]

Please let me know your thoughts.

Cheers
Dazz

-----Original Message-----

From: [REDACTED]
Sent: Thursday, 31 March 2005 8:25 AM
To: Rolfe, Darren
Subject: FW: Yarra brickworks mowing

Darren,
The price to complete a maintenance program that involves 6 mows {every 2 months} and one poison spray in early December, will be [REDACTED] exclusive. This is for the areas we have just mowed and sprayed. If other areas within this block are to be included, could you please let me know.

Ta

555

Burden, Ross

From: [Redacted]
Sent: Friday, 30 December 2005 9:21 AM
To: Burden, Ross
Subject: FW: Yarralumla Brickworks- Horticulture Maintenance

Ross,
I requested the additional mow on Thursday 8/12/05 and the contractor - Pastures Rural performed the work on Friday 9/12/05 with a tractor/slasher . I inspected the work at approx. 2.45pm. The area to be mowed as requested by ACT Property was between the Brickworks and the first row of trees - approx. 30 metres wide and 80 metres long; the fence line running east/west - approx. 25 metres wide and continuing around to the new townhouses on Schomburgk st. Due to the slope and shale rock areas, some sections were inaccessible. However, all areas that could be mowed, taking into account the safety of operator and machinery, were completed to a high standard.

Ta



-----Original Message-----

From: [Redacted]
Sent: Friday, 30 December 2005 8:48 AM
To: Burden, Ross
Subject: FW: Yarralumla Brickworks- Horticulture Maintenance

-----Original Message-----

From: Fleming, Di
Sent: Tuesday, 6 December 2005 2:31 PM
To: [Redacted]
Subject: RE: Yarralumla Brickworks- Horticulture Maintenance



Thanks for your assistance.

Di Fleming
Property Manager,
Urban Services
Ph: 620 58282 Fax: 621 30735
Mobile: 0417 209 083

-----Original Message-----

From: [Redacted]
Sent: Tuesday, 6 December 2005 2:21 PM
To: Fleming, Di
Subject: RE: Yarralumla Brickworks- Horticulture Maintenance

557

Di,
Our contractor mowed the fire break on 19/11/05. I inspected the work and it was satisfactory, however, due to the amount of recent rains, the grass may have shot up. I can inspect tomorrow and if it is starting to look out of spec, we can mow again before xmas.
The annual spray of small blackberry bushes and suckers will take place early April. This is due to environmental policies restricting times to spray.

Ta



-----Original Message-----

From: Fleming, Di
Sent: Tuesday, 6 December 2005 2:04 PM
To: [Redacted]
Subject: Yarralumla Brickworks- Horticulture Maintenance

Scott,

I received notification on 30/11 that the fire break is overgrown and is infringing onto private fences. Could you please advise as to when the next mowing and clean up is due for the Yarralumla Brickworks.

Thanks

Di Fleming
Property Manager,
Urban Services
Ph: 620 58282 Fax: 621 30735
Mobile: 0417 209 083

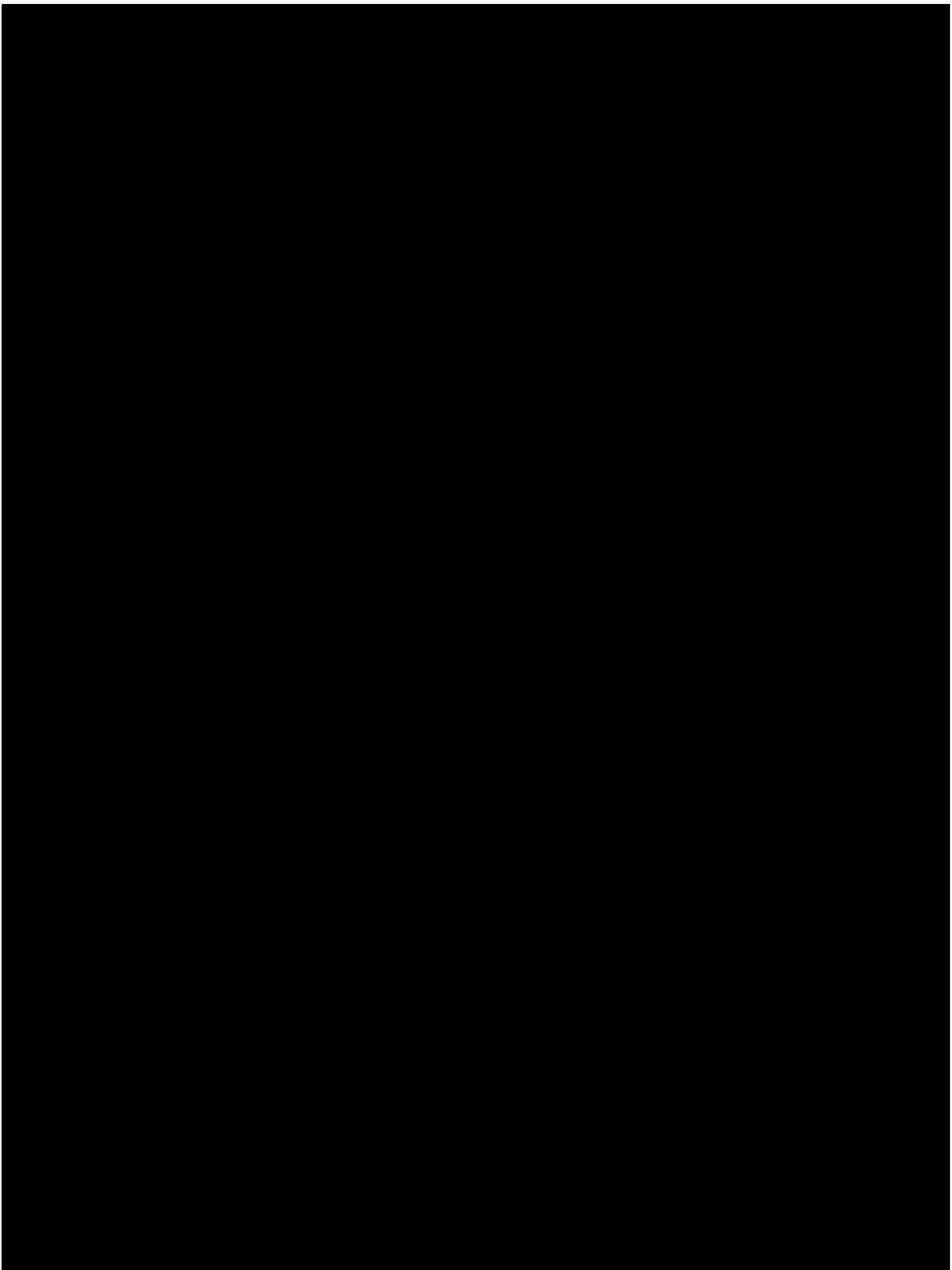
559

22/12 2005 07:05 FAX

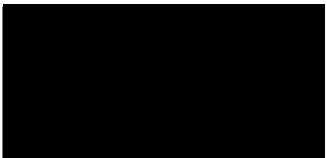
+ KAMBAH

004/020

560



Burden, Ross
From: [Redacted]
Sent: Friday, 30 December 2005 8:48 AM
To: Burden, Ross
Subject: FW: Yarralumla Brickworks- Horticulture Maintenance



-----Original Message-----

From: Fleming, Di
Sent: Tuesday, 6 December 2005 2:31 PM
To: [Redacted]
Subject: RE: Yarralumla Brickworks- Horticulture Maintenance

Scott,

Thanks for your assistance.

Di Fleming
 Property Manager,
 Urban Services
 Ph: 620 58282 Fax: 621 30735
 Mobile: 0417 209 083

-----Original Message-----

From: [Redacted]
Sent: Tuesday, 6 December 2005 2:21 PM
To: Fleming, Di
Subject: RE: Yarralumla Brickworks- Horticulture Maintenance

Di,
 Our contractor mowed the fire break on 19/11/05. I inspected the work and it was satisfactory, however, due to the amount of recent rains, the grass may have shot up. I can inspect tomorrow and if it is starting to look out of spec, we can mow again before xmas.
 The annual spray of small blackberry bushes and suckers will take place early April. This is due to environmental policies restricting times to spray.

Ta



-----Original Message-----

From: Fleming, Di
Sent: Tuesday, 6 December 2005 2:04 PM

56A

To: [REDACTED]
Subject: Yarralumla Brickworks- Horticulture Maintenance

[REDACTED]

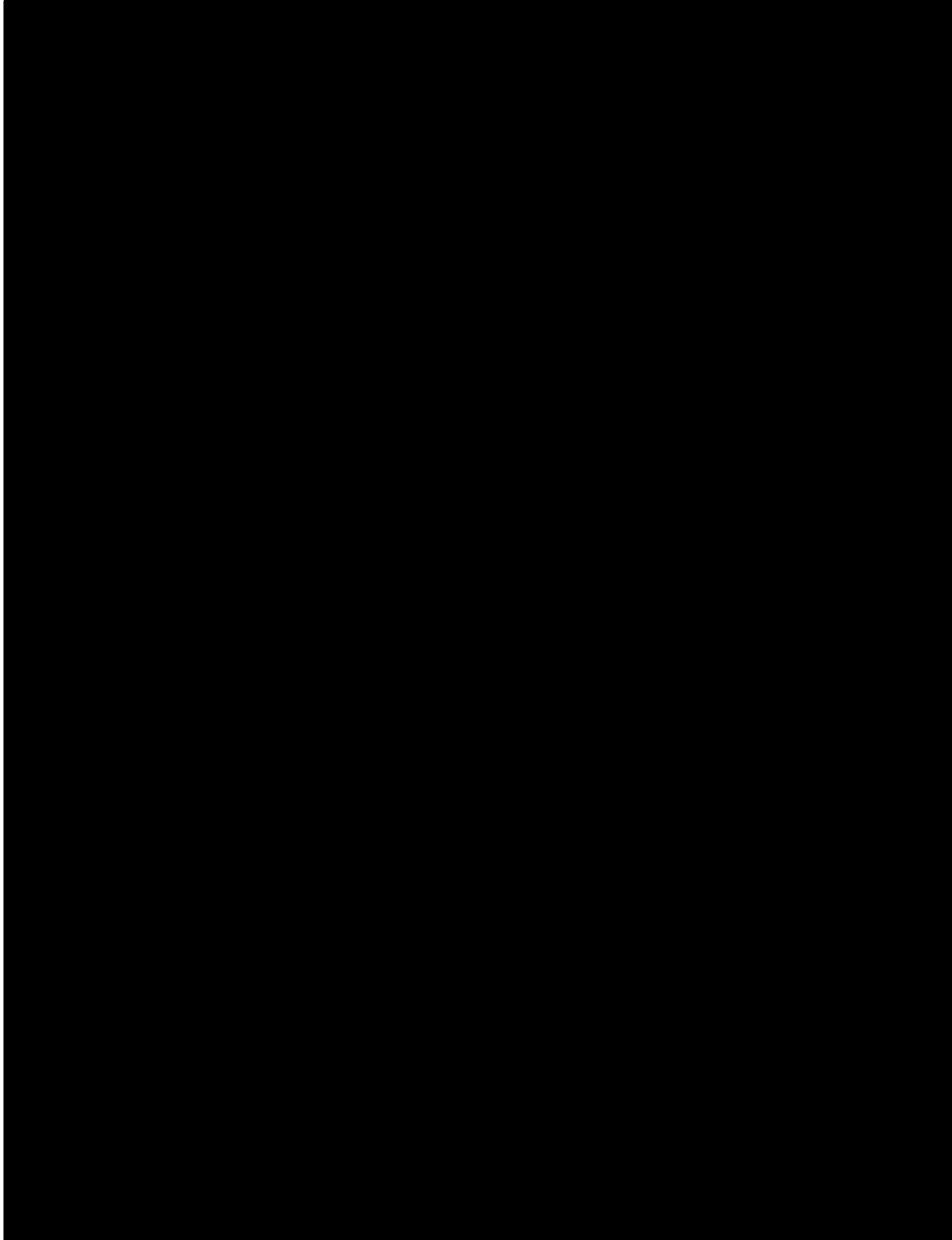
I received notification on 30/11 that the fire break is overgrown and is infringing onto private fences. Could you please advise as to when the next mowing and clean up is due for the Yarralumla Brickworks.

Thanks

Di Fleming
Property Manager,
Urban Services
Ph: 620 58282 Fax: 621 30735
Mobile: 0417 209 083

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[REDACTED]

From: Lee Carmody [leecarmody@pasturesrural.com.au]
Sent: Monday, 21 November 2005 5:44 PM
To: [REDACTED]
Subject: Brickworks

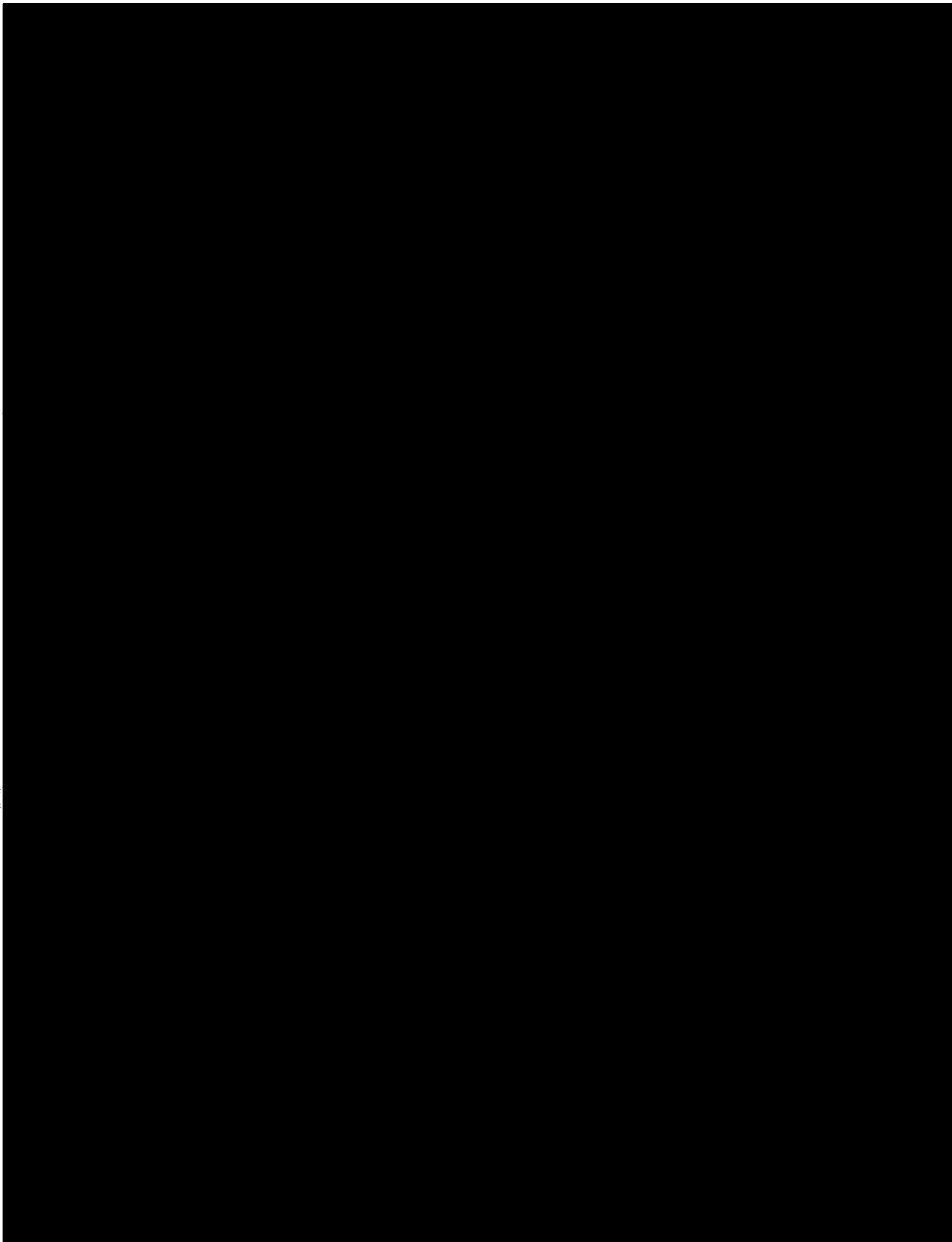
[REDACTED]

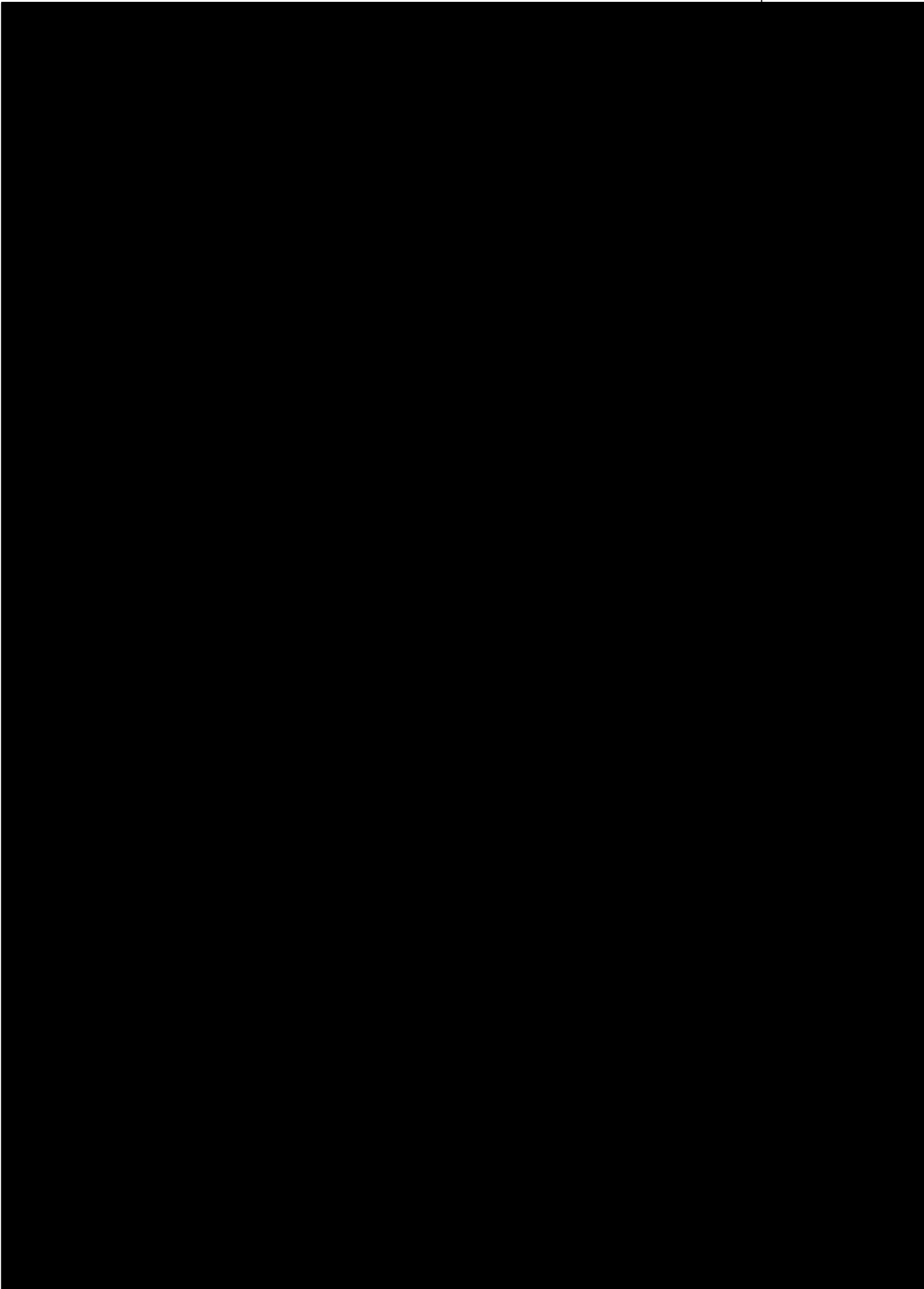
We have mown the brickworks block on Saturday 19/11/05.

Regards

Lee Carmody
Business Manager
Pastures Rural Contractors
Ph. (02) 6257 8050
Fax. (02) 6257 8065
Mob. 0418 257 580

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ATTN: ROSS 001

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BUNDEN



Please find attached the details of a problem/fault that has been reported to us.
Could you please attend to this problem as soon as possible.
If you have any queries please contact DUS - Property ACT on 6213 0704

OBTAIN PROPERTY MANAGEMENT'S APPROVAL FOR ALL WORKS LIKELY TO EXCEED \$500.

Reference Number: 34879

Priority:	Other	
Maintenance Reference:		
Report Date:	10/05/05	15:45

Building:	Yarralumla Brickworks / 239
Level:	Horticulture
Address:	Denman Drive Yarralumla

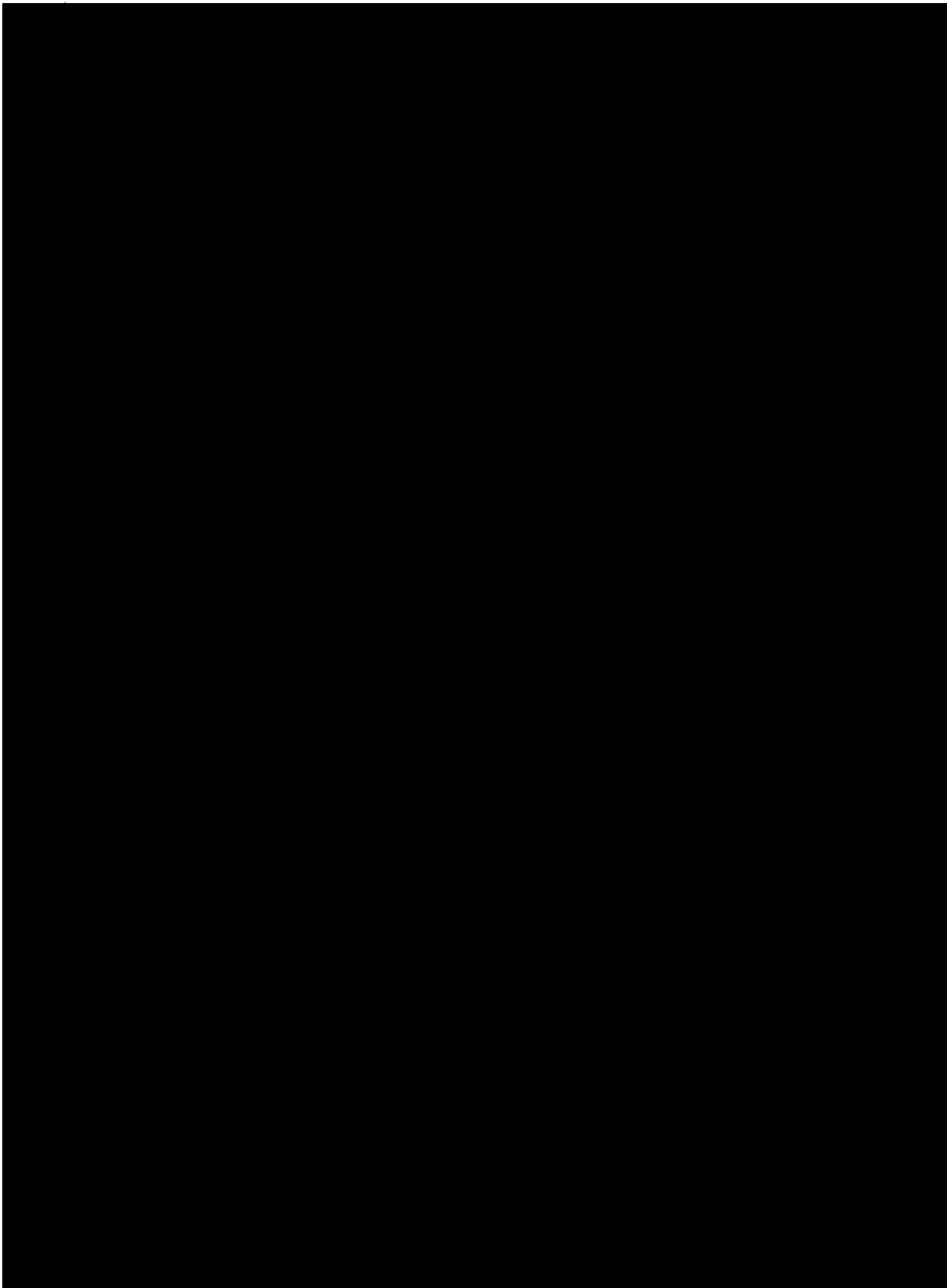
Reporting Occupant :	Property ACT
	Darren Rolfe
	6213 0741

Cost Group:	
Problem Code :	Horticulture
Problem Description:	<p>██████████ Please proceed with the scheduled maintenance program for the Brickworks Site, ██████████ for 6 mows per year and annual spray for noxious weeds. Please contact Darren in Property Management should you require further information. Work to commence 01 July 2005.</p>

Call Taken By: Darren Rolfe

Contractor Name:	
Contractor Contact:	
Phone :	
Fax:	
Address:	

Special Comments :



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YARRA BRICKWORKS

Pittard, Scott

From: Rolfe, Darren
Sent: Wednesday, 2 March 2005 12:20 PM
To: [REDACTED]
Subject: RE: Yarra brickworks mowing

ROSS - RE: TREES

Hi Scott,

Please proceed with your quote of [REDACTED] inclusive for the cleanup of the Yarralumla Brickworks. I confirm that the trees on the site that are marked with and X or any other marking are to be left at this stage. Please proceed with the mowing etc prior to poisoning.

The keys to the site are available for collection at any time that is good for you, I am located at the O'Connell Centre, Stuart Street, Griffith.

Please contact me should you require further clarification.

Yours sincerely
Darren Rolfe
Property Manager.

-----Original Message-----

From: [REDACTED]
Sent: Wednesday, 2 March 2005 10:57 AM
To: Rolfe, Darren
Subject: Yarra brickworks mowing

Darren,
As discussed, mowing will commence early next week. I will require a key for the gate to gain access and either I can pick up from your office or alternatively, if you are out Tuggeranong way, you can drop off into my pigeon hole at [REDACTED]

Could you also confirm acceptance of the quote.
I will also arrange to give you a price for poisoning /removal of large blackberry bushes. Process would be to poison the bushes off, wait 4 weeks and remove or mulch up. This ensures no suckering after removal.

Ta



TO: HELENISON

FAXED
28/6/05

KOSS BURDEN

Anneze 5

Name INNER SOUTH TIME SHEET

22/12/2005

PETER BREUST	SUPERVISION
GRAHAM BARNES	MOWING F/D KINGS AVENUE
TRUNG TRAN	MOWING SHOPS
TONY SORBARA	MOWING 4000D LATROBE PARK
FRANK CATANIA	SLASHER YARRALUMLA DRYLAND OVAL BANKS ST
DOMINIC SCARCELLA	SHOPS PRUNING
SOM CHALEUNE	MOWING SHOPS
PAUL MORGAN	MOWING CANBERRA AVENUE
PETER MONTELIONE	CLEANING
ANDREW COX	TOILET
DOUG LAWRENCE	SLASHER YARRALUMLA DENMAM ST BRICKWORKS
CRAIG BEASLEY	CLEANING
GIOVANNI NAPPI	CLEANING

P. Breust
Inner South
Supervisor

Part Two

Information Requested from Property Group for Coronial Inquest into Yarralumla Brickworks Fire

Could you please provide some advice of the status of the land, i.e. is it wholly or partly public or private land?

It is unleased territory land managed by Property Group in the Department of Territories and Municipal Services. It is not designated public open space and is fenced off to prevent entry.

Over the years, the ACT Planning and Land Authority has done a few studies on the future use of the site. Property Group does not have access to all of the reports that resulted from those studies. If you think there are relevant to the Inquest the contact in ACTPLA is Catherine Keirnan.

Are there any restrictions on the site?

The land use on the site is Entertainment, Accommodation and Leisure. Refer Attachment A – extract from the Territory Plan. Note page 4 which refers specifically to the Yarralumla Brickworks.

The site is also Heritage Listed. Refer Attachment B – Heritage listing

What are the current tenant agreements for the site and what are their obligations in regards to maintenance of the site?

There is one regular tenant, Thor's Hammer - tenancy is a licence which expired on 17 February 2005 and remains on a quarterly holding over basis. Attachment C – Copy of licence agreement.

The following people/groups use the site but there are no formal arrangements in place and they are granted access by the licensee, Thor's Hammer.

- Paul Lynzoot, mud brick maker
- Adam Herst, ornamental iron work
- Peter Vandermark, sculptor
- Marie Hegarty, artist
- Alan Reid, builder
- Steve Burroughs, builder
- Canberra Historical Society
- ACT Heritage
- Chris Sneddon, retired builder

I am interested in relevant information such as dates that clearing had been conducted on the site, the extent of that clearing, and who it was carried out by?

Refer Fact Sheet at Attachment D which provided details of clearing conducted on the site and information provided by Ross Burden.

An email detailing our agreement on a mowing program with Parks and Places was confirmed by a work order issued on 10 May 2005 (see Annexe 4 information provided by Ross Burden).

Please include if you are aware of any risk assessments that has been conducted on the site and what action occurred as a result of these assessments.

There is no record of a formal, written risk assessment. Having said this, after the January 2003 fires, Property did a risk assessment that resulted in trees being removed to establish a 15 metre urban space buffer from the residential boundaries. When this work was being conducted some of the residents requested that some trees remain. Advice was sought from the GSO and on the basis of that advice it was agreed that a few of the trees could remain.

I have been made aware that some major works occurred on the site after the fires that occurred in December 2001. If possible could you provide information regarding the process of this clearing and what this action would achieve in the management of site? Please include any further historical information that you are able to provide and you feel is relevant to the inquest.

As mentioned above, clearing was done as a result of the January 2003 fires and established a 15 metre urban space buffer. There is no record on file of clearing after the December 2001 fire.

- | | |
|--------------|---|
| Attachment A | extract from the Territory Plan - Entertainment, Accommodation and Leisure Land Use Policy. |
| Attachment B | Yarralumla Brickworks Heritage listing |
| Attachment C | Yarralumla Brickworks Licence Agreement |
| Attachment D | Yarralumla Brickworks Facts Sheet |

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PART B8 ENTERTAINMENT, ACCOMMODATION AND LEISURE LAND USE POLICIES

While Canberra's national institutions and natural features provide a major focus for tourist activities in the ACT, a range of other complementary and supportive entertainment and leisure facilities serve to diversify opportunities for recreation, tourism and leisure. The main uses within these areas are cultural, entertainment and tourist facilities such as cinemas, theatres, concert halls, galleries, clubs, hotels, motels, convention centres, tourist attractions and restaurants. A number of these uses specifically cater for tourists to the ACT, but many others provide entertainment opportunities for both visitors and residents of the ACT and surrounding region.

The Entertainment, Accommodation and Leisure Land Use Policies are used where a need has been identified to set aside land specifically for those uses. Most of these uses are already provided for within the Commercial Land Use Policies. However within Commercial Land Use Policy areas they must compete with a range of other uses for space.

The Entertainment, Accommodation and Leisure Land Use Policies contain a number of controls including restrictions on shops to protect the commercial centres hierarchy and performance measures for setbacks and building height to protect adjacent residential areas.

The Area Specific Policies identify a number of areas where there are more specific objectives to enable mixed commercial, residential, entertainment, accommodation and leisure uses, or to restrict land uses to tourist or recreation uses.

NB The text in this box is for information purposes only and is not intended to form part of the policy content of the Plan.



2. CONTROLS

2.1 Land Use [V54]¹

Subject to other provisions of the Entertainment, Accommodation and Leisure Land Use Policies below, land described on the Map as Entertainment, Accommodation and Leisure may be used for one or more of the purposes listed in the schedule below.

SCHEDULE 1	
ENTERTAINMENT, ACCOMMODATION AND LEISURE LAND USE	
Purposes for which land may be used	
Aquatic recreation facility	Indoor recreation facility
Car park	Motel ⁺
Caravan park/ Camping ground	Outdoor recreation facility ⁺
Club ⁺	Overnight camping area
COMMUNITY USE	Parkland
Craft workshop	Place of assembly
Drink establishment ⁺	Public transport facility ⁺
Drive-in cinema	Restaurant
Group or organised camp	Shop ¹
Guest house ⁺	Totalisator Agency Board (TAB)
Hotel ⁺	Tourist facility
Indoor entertainment facility ⁺	Zoological facility
⁺ May be subject to mandatory preliminary assessment under the Land Act (see Appendix II) ¹ Subject to Land Use Restrictions (see clause 2.2)	
Notwithstanding the provisions of this schedule, land may be used for temporary uses, minor uses and uses ancillary to the principal use of the land, provided there is no conflict with the objectives in section 1	

2.2 Land Use Restrictions

Shop

To protect the planned hierarchy of commercial centres whilst providing for tourist retailing, a shop must be ancillary to the use of the land for entertainment, accommodation or leisure purposes, or be restricted to tourist-related goods such as arts and crafts and souvenirs. Sale of food (except for takeaway food) is not permitted.

The maximum gross floor area of any shop (other than for arts, crafts or souvenirs) is 250m².

2.3 Building Height

Dickson Section 72

Buildings on Dickson Section 72 shall be a maximum height of two storeys.

¹ [V54: delete "Equestrian facility" from Schedule 1, 10/04/1997 (Variation Number 54)]



b) Land Use Restrictions

Office

Maximum gross floor area: 1500m².

Shop

Maximum gross floor area: 500m². There is no floorspace limit for arts, crafts and sculpture dealers and associated facilities; and/or retailing associated directly with or ancillary to the hotel and country club.

c) Planning Guidelines

The document titled Yarralumla Brickworks South Canberra Policy Plan October 1988 relating to this site is adopted by the Territory as a Planning Guideline.

Buildings with heritage values shall be protected (refer to Planning Guideline).

d) Building Height and Setbacks

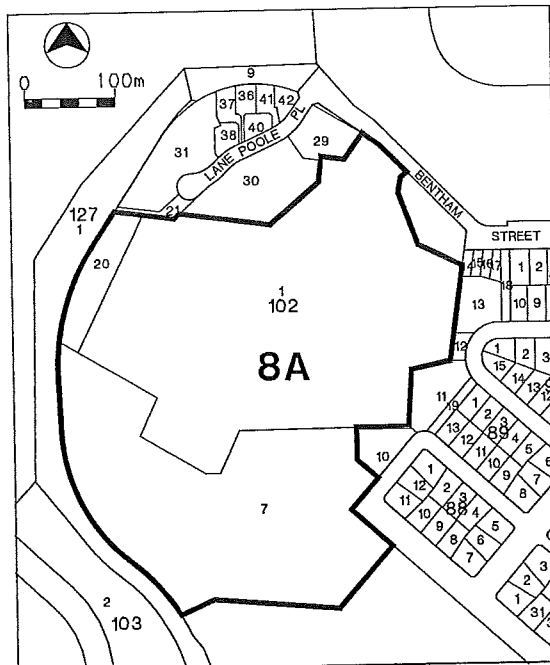
Height

RESIDENTIAL USE: maximum 3 storeys; other land uses: maximum 2 storeys.

Setbacks

20 metres from northern and eastern boundary of Area 8A.

Figure 1: Area 8A Yarralumla Brickworks, Yarralumla Section 102





Area 8C Entertainment and Small Office areas: Barton Section 23, Narrabundah Section 34 (part)

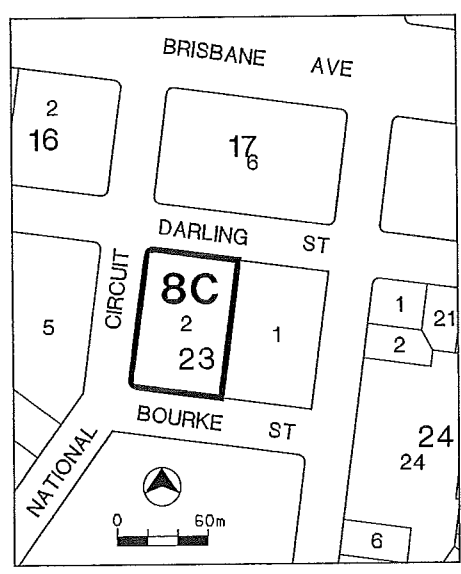
Objective

- Add to Clause 1:
 - to make provision for small scale offices.

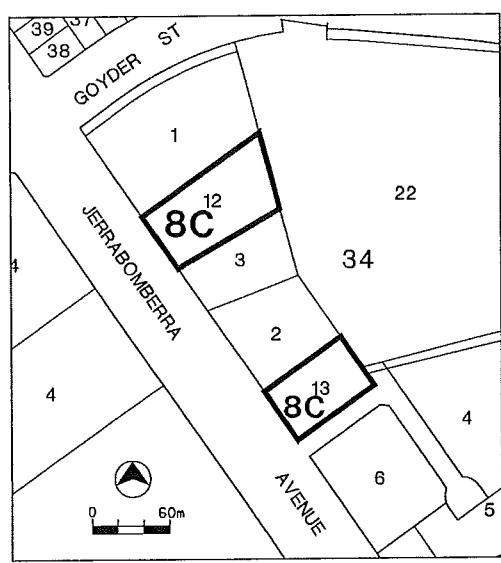
Controls

- a) **Land Use**
 - Add to Schedule 1:
 - Business agency, Office.

Figure 3: Area 8C Entertainment and Small Office areas: Barton Section 23



Area 8C Entertainment and Small Office areas: Narrabundah Section 34 (part)



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TERRITORY PLAN
PART B8: ENTERTAINMENT, ACCOMMODATION AND LEISURE LAND USE POLICIES

Area 8E Tourist areas:

Gold Creek
Tuggeranong south of Hume
Watson Section 75
Gilmore Section 79, Section 65 (Part),

Objective

Add to Clause 1:

- to provide sites primarily for tourism developments.

Controls

a) Land Use

Add to schedule 1:

- **Service station.**

Service station may be subject to mandatory preliminary assessment under the Land Act (see Appendix II).

b) Buildings in Gold Creek

Building - maximum height: 2 storeys

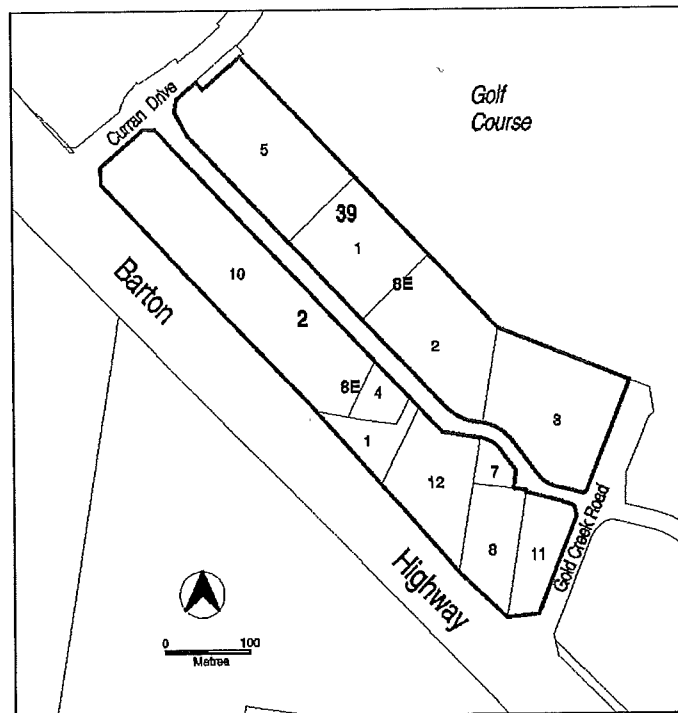
Development within and adjacent to the Ginninderra historic precinct in Gold Creek shall be sympathetic in materials and form to the historic features of the precinct.

c) Land Use Restriction

Service station⁵

Retail sales (excluding the sale, hire or display of automotive goods): maximum gross floor area shall not exceed 150m².

Figure 5: Area 8E Tourist area: Gold Creek [V239]⁵



⁵ [V239: Figure 5 was amended May 2004 (Defined Land Variation No.239)]

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Area 8F Tourism, Leisure and Broadacre Area, Weston Creek (Deleted) [V144]⁶

Area 8G Convention area, City Section 65

Objectives

Add to Clause 1:

- to ensure that an area in Civic Centre is reserved for the provision of commercial recreation facilities to serve the recreation and tourism needs of the workforce, Canberra residents, tourists and visitors to Civic Centre; and
- to accommodate tourist facilities and accommodation which can benefit from a location close to the Convention Centre.

Controls

a) Land Use

Add to schedule 1:

- Business agency, Pedestrian plaza, RESIDENTIAL USE.

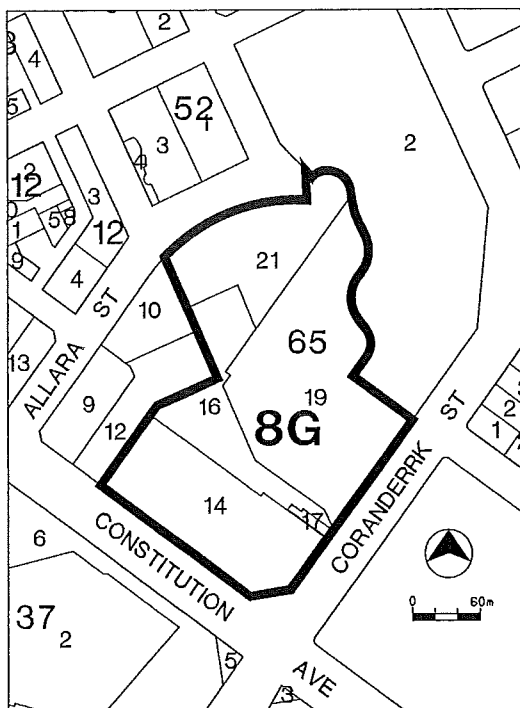
b) Land Use Restrictions

Shops are restricted to personal services and those ancillary to the main land use.

c) Building Height and Colour

Buildings in City Section 65 shall be low to medium rise. Building colour shall be predominantly off white to light buff/grey.

Figure 8: Area 8G Convention area, City Section 65



⁶ [V144: Area 8F Tourism, Leisure and Broadacre Area, Weston Creek was deleted on 06/07/2000 (Variation Number 144)]

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Area 8I Entertainment and Commercial Area, Belconnen Lakeshore, Belconnen Section 65 and 187

Objective

Add to Clause 1:

- to provide leisure and recreation activities related to the lake and the town centre.

Controls

a) Land Use

The only purposes for which land may be used are:

Club, COMMUNITY USE, Craft workshop, Drink establishment, Hotel, Indoor entertainment facility⁺, Indoor recreation facility, Motel, Office, Outdoor recreation facility⁺, Parkland, Pedestrian plaza, Place of assembly, RESIDENTIAL USE, Restaurant, Shop, Totalisator Agency Board (TAB), Tourist facility. Land uses marked ⁺ may be subject to mandatory preliminary assessment under the Land Act (see Appendix II).

b) Land Use Restrictions

Office, RESIDENTIAL USE

On upper levels only.

Shop

Shall be related to recreation and leisure activities.

c) Built Form and Height

Building scale

Small scale set in landscape.

Buildings on Section 65

Maximum height of 2 storeys.

Buildings on Section 187

Maximum height of 4 storeys on southern and western boundaries and 2 storeys elsewhere.

There shall be a continuous pedestrian plaza along the entire lake-shore.



Area 8K Entertainment Accommodation, Leisure and Residential area, Narrabundah Section 100, North Watson [V5]⁸

Objective

Add to clause 1:

- to provide opportunities for commercial accommodation and residential uses.

Control

a) Land Use

Add to Schedule 1:

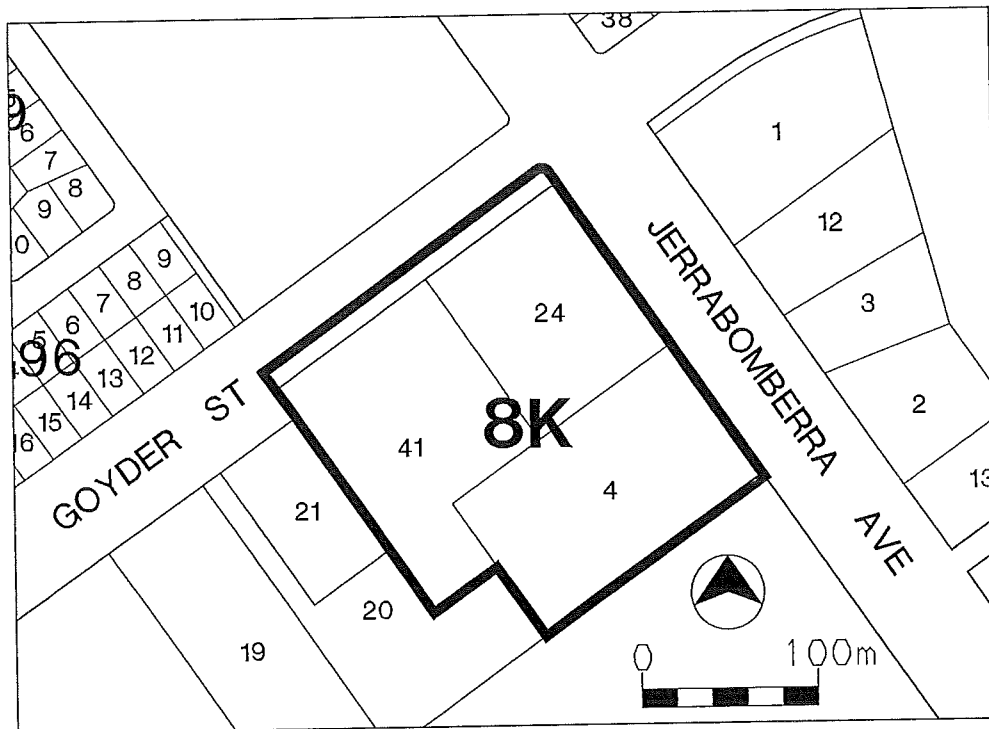
- RESIDENTIAL USE

b) Building Height

Narrabundah Section 100: Building height shall be maximum 2 storeys.

Watson Sections 61, 63, 64 and 74: Building height shall be predominantly 2 storeys.

Figure 12: Area 8K Entertainment and Residential area, Narrabundah Section 100



⁸ [V5: Area Specific Policy '8K' and map amended 14/03/1994 to include land within Watson (Variation Number 5)]



Area 8L Kingston Foreshore Area [V113]⁹

Objectives

Add to Clause 1:

The objectives of the Area 8L Entertainment Accommodation and Leisure Kingston are:

- to create a vibrant mixed use water front development incorporating a strong arts, cultural and tourism theme;
- to create an efficient and sustainable urban environment providing a diversity of living, working and recreation opportunities and to undertake development using best practice environmentally sustainable development principles;
- to reflect and celebrate the cultural significance of the site;
- to provide the Canberra community with opportunities to express their interests, diversity, aspirations, innovation and talents in a manner which can be experienced by residents and visitors alike;
- to enhance and support the primacy of the Parliamentary Zone as the setting for National Capital functions;
- to strengthen and enhance the major symbolic features of the Griffin plan;
- to provide opportunities for residents and visitors to access and experience the foreshore in multiple ways;
- to make provision for a range of uses which are complementary to the role of the Kingston Group Centre but which are not principally related to the convenience shopping functions of the Centre; and
- to undertake development in a manner consistent with the management principles for Lake Burley Griffin and Jerrabomberra Wetlands.

⁹ [V113: Area 8L Kingston Foreshore Area added 08/06/2000 (Variation Number 113)]

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- c) to provide the opportunity for residential units and commercial accommodation uses to ensure diversity of use and social interaction;
- d) to encourage activities at street and promenade level which contribute to pedestrian activity and social interaction;
- e) to provide leisure and recreation activities related to Lake Burley Griffin; and
- f) to ensure public access to the water is maintained and reinforced.

Precinct 'c' Harbour Front

Objectives:

- a) to provide an interface between the functions of the public domain, water borne activities on Lake Burley Griffin and appropriate entertainment and commercial activities;
- b) to encourage a mix of land uses which contribute to a diverse and active character and provide multiple opportunities for living and working;
- c) to encourage activities at promenade frontage level which contribute to pedestrian activity and social interaction;
- d) to make provision for uses which require access to the water or support water based activities;
- e) to make provision for commercial activities which are complementary, but secondary to the primary retail role of the Kingston and Manuka Group Centres;
- f) to provide leisure and recreation activities related to Lake Burley Griffin; and
- g) to ensure public access to the water is maintained and reinforced.

Precinct 'd' Avenue/Causeway

Objectives:

- a) to provide an appropriate transition from the adjacent residential uses to the foreshore;
- b) to encourage a mix of land uses which contribute to a diverse and active character and provide multiple opportunities for living and working;
- c) to reinforce the character of Wentworth Avenue as an important Avenue by facilitating the development of prestigious buildings which contribute to the quality and intensity of development of the avenue;
- d) to ensure the continued effective function of Wentworth Avenue as a major traffic route, improve pedestrian safety and recognise its role in the parking strategy for the wider Kingston area;
- e) to provide opportunities for the development of land uses which will benefit from the good visibility and high level of accessibility afforded to properties with a frontage to Wentworth Avenue and The Causeway; and
- f) to ensure that traffic and parking generated by the development does not unacceptably affect the safe and efficient functioning of the existing roads or cause an unacceptable nuisance to existing residents.

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Controls

a) Land Use

Subject to other provisions of the Kingston Foreshore policies herein, land in the specific precinct may be used for one or more purposes listed in the schedule below. The columns marked 'a' 'b' 'c' 'd' 'e' 'f' 'g' in the schedule below correspond to the precincts identified in Figure 12.

SCHEDULE 1 ENTERTAINMENT, ACCOMMODATION AND LEISURE (KINGSTON FORESHORE) LAND USE POLICIES							
Land Use	Precincts						
	'a' Foreshore Parklands	'b' Lake Front	'c' Harbour Front	'd' Avenue/ Causeway	'e' Cunningham Street	'f' The Common	'g' Power House
Apartment		Y	Y ¹	Y	Y		Y
Attached house		Y	Y	Y	Y		
Aquatic recreation facility	Y ¹	Y	Y			Y	
Boarding house		Y	Y	Y	Y		
Car park	Y	Y	Y	Y	Y	Y	Y
Child care centre		Y	Y	Y	Y	Y	
Club ⁺		Y	Y				
Community activity centre		Y	Y	Y	Y	Y ¹	Y
Community theatre		Y	Y	Y	Y		Y
Craft workshop		Y	Y	Y	Y		Y
Cultural facility		Y	Y	Y	Y		Y
Detached house				Y	Y		
Drink establishment ⁺		Y	Y				Y
Educational establishment		Y	Y	Y	Y		Y
Emergency services facility		Y	Y			Y	
Guest house		Y	Y	Y	Y		Y
Health facility		Y	Y	Y	Y		Y
Home business		Y	Y	Y	Y		Y
Hotel		Y	Y				
Indoor entertainment facility ⁺		Y	Y				Y
Indoor recreation facility		Y	Y	Y	Y	Y	Y
Light industry			Y		Y		Y
Major utility installation ⁺	Y ¹	Y ¹	Y ¹	Y ¹	Y ¹	Y ¹	Y ¹
Motel		Y	Y	Y	Y		
Municipal depot			Y				
Office ⁺		Y ¹	Y ¹	Y ¹	Y		Y ¹
Outdoor recreation facility ⁺	Y ¹	Y	Y	Y	Y	Y ¹	Y
Parkland	Y	Y	Y	Y	Y	Y	Y
Pedestrian plaza	Y	Y	Y	Y	Y	Y	Y

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b) Land Use Restrictions

Apartment

Generally restricted to upper levels to ensure active uses at ground floor level.

Aquatic recreation facility

Not permitted adjacent to Jerrabomberra Creek.

Community activity centres (Precinct 'f') and Outdoor recreation facilities (Precincts 'a' and 'f')

May only be permitted where:

- the proposed location is suitable in terms of the catchment to be served and access routes for users;
- there is a community requirement for such facilities;
- there will be adequate opportunities for the public or community to use the facilities;
- the nature of landscape works to be carried out is consistent with the surrounding open space or identified landscape theme;
- public access to adjoining open space is adequate;
- sufficient open space is retained for other future purposes;
- the proposal will not have an adverse impact on the open space environment in terms of design and aesthetics;
- the proposal will not adversely affect naturally occurring plant communities and patterns of wildlife movement;
- important natural and cultural features including existing mature trees are conserved; and
- there are no adverse noise and safety impacts on adjoining residential areas.

Major utility installation

Shall only be permitted where required for the essential operation of the electricity supply network, the augmentation of the local water and sewerage system or the management of the stormwater system.

Office

Power House (Precinct 'g'): The gross floor area shall not exceed 500m² per lease.

Lake Front and Harbour Front (Precincts 'b' and 'c'): The gross floor area shall not exceed 500m² per lease and generally not be permitted at ground floor level.

Avenue/Causeway (Precinct 'd'): The gross floor area shall not exceed 2000m² per lease.

Service station

Retail sales (excluding the sale, hire or display of automotive goods): maximum gross floor area shall not exceed 150m².



Materials and Finishes

Materials on buildings and structures near the Lake edge shall be of a durable and low maintenance nature with a high quality in the materials used. Buildings fronting the Lake edge should generally avoid the use of highly reflective materials.

Lighting

Outdoor lighting in the area should generally use full cut-off light fittings and up-lighting of buildings and structures should be carefully designed to keep night time overspill lighting to a minimum.

The overall lighting impact should not compete in prominence with the lighting of the National Triangle. The area should be lit predominantly with high pressure sodium light sources for streets and mercury vapour for pedestrian routes. Lake frontage external lighting should use metal halide sources. There should be no flashing or laser beam lighting used on or around buildings fronting Lake Burley Griffin.



ACT Heritage Council

Entry to the ACT Heritage Register

Heritage Act 2004

20068. Yarralumla Brickworks

Section 102 Block 1

YARRALUMLA

This document has been prepared by the ACT Heritage Council.

This entry which was previously part of the old heritage places or the old heritage objects registers (as defined in the *Heritage Act 2004*), as the case may be, is taken to be registered under the *Heritage Act 2004*.

Conservation Requirements (including Specific Requirements), as defined under the *Heritage Act 2004*, that are contained within this document are taken to be Heritage Guidelines applying to this place or object, as the case may be.

Information restricted under *the old heritage places register or old heritage objects register* is restricted under the *Heritage Act 2004*.

Contact: ACT Heritage Council c/o Secretary PO Box 144
Enquiries: phone 02 6207 2164 fax 02 6207 5715

Lyneham ACT 2602
e-mail heritage@act.gov.au



ACT Government



environment ACT

Helpline: 02 6207 9777
Website : www.cmd.act.gov.au
E-mail: EnvironmentACT@act.gov.au

The largest chimney stack (element 9) is of aesthetic and social value as a prominent landmark in the central urban area, visible from the Lake Burley Griffin foreshores, New Parliament House and mountain lookouts around the City. Additional aesthetic value is associated with the composition and sculptural forms of the built elements, specifically the kilns, stacks and larger elements of equipment.

The Yarralumla Brickworks is one of a broad thematic group of remnant industrial and engineering heritage places that were built to facilitate the initial development of Canberra including the Cotter Dam and Pumping Station and the Kingston Power House.

The brickpits have historical value as a primary source of clay and are also of considerable geological value as the type locality for the 'Yarralumla Formation', dating from the Silurian Period 425 million years ago. The scheduled stratigraphic rock units constitute the reference section against which all other outcrops within the Formation are compared. It is the only fossil marine unit within the extensive volcanic marker horizons of South Canberra. Sites A and D show excellent examples of an anticline in calcareous siltstone, Site B shows a typical tuffaceous mudstone and siltstone of the Yarralumla Formation and Site C shows abundant fossils of mainly graptolites, trilobites, coral and a simple crinoid preserved in a bedding plane.

Specific Requirements

In accordance with s54 (1) of the *Land (Planning and Environment) Act 1991* the following requirements are identified as essential to the conservation of the heritage significance of the place. These requirements are prepared to implement the following conservation policy for the place:

The identified heritage values and intrinsic features of the place shall be conserved whilst allowing for the integrated and sympathetic redevelopment of the place as a single entity, consistent with contemporary practices for the adaptive reuse of industrial and commercial heritage places. In conserving and developing the place, its significant historical use as an industrial site for the production of bricks and clay products shall continue to be evident and accessible to the public.

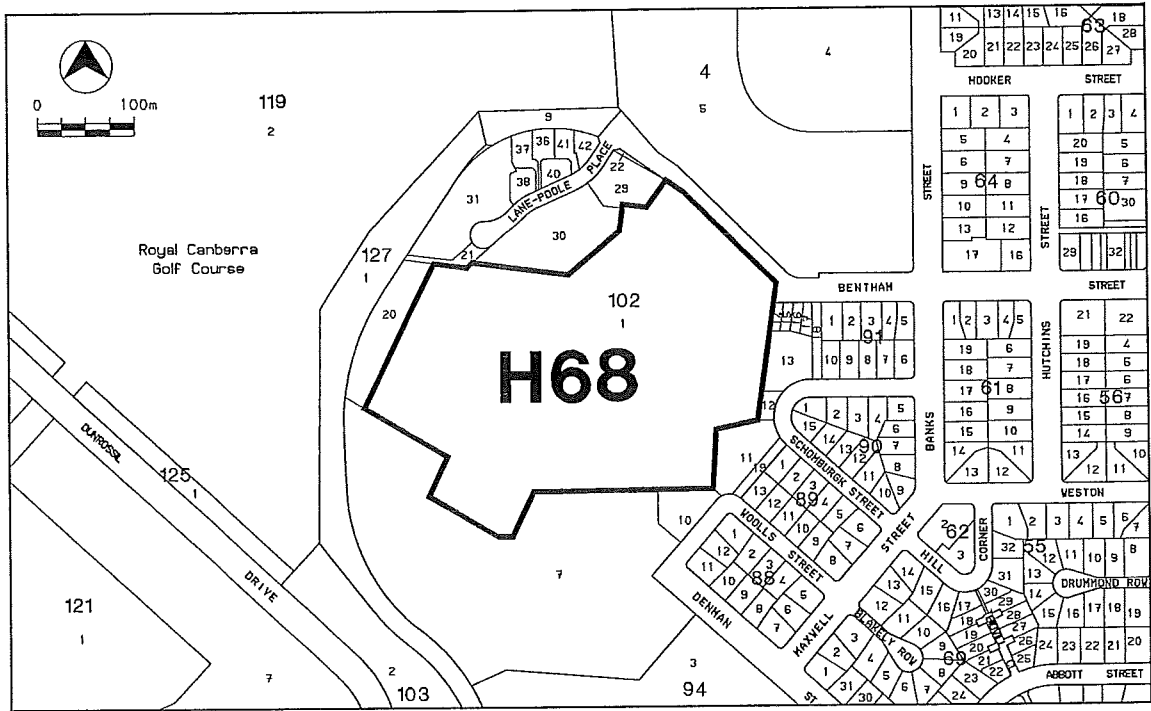
Redevelopment of all or part of the place shall be in accordance with a Conservation and Management Plan endorsed by the ACT Heritage Council.

i) Landscape Setting

- a) The quarry landform (11) should be retained in a manner whereby it is clearly evident to be a man made excavation, associated with the industrial use of the site. Subject to the recommendations of the Conservation and Management Plan, revegetation, enhanced hard and soft landscaping and low-medium height buildings with a high proportion of landscape open space may be permitted in the vicinity of the quarry, including on land overlooking the quarry and within the quarry excavation. The shape of the quarry may be altered in a minor manner, however access points into and out of the quarry area should utilise existing openings and gradients within the landform. The historical linkage between the quarry and kiln areas shall be expressed in any new development.
- b) The geological features (12 A-D) shall be integrated within any site landscaping treatment. Disturbance of the immediate surface shall be limited to works that protect, stabilise or enhance the interpretation of the geological values. The immediate environs of the geological features to a distance of approximately 10 metres shall be retained as landscape open space.
- c) To reflect historical usage patterns at the site and protect the setting of significant elements, the immediate environs of the kilns (1, 3, 5, 6) as identified below shall be retained as landscape open space, clear of any major structures. Minor structures and landscaping treatments that retain the kilns, stacks and fan houses as the dominant visual elements to the space may be permitted within:
 - The open concourse running north-south from the Hardy Patent Kiln (Element 5) to the Downdraft Kilns (6a-c), between the kilns and fan houses (2, 4),
 - The spaces between the kilns: (5-3, 3-1, 1-6)
 - The immediate environs of the chimney stacks (7, 8, 9, 10), fan houses (2, 4) and primary crusher house and elevator conveyor (20, 22) to a distance of generally 10m.
- d) New hard and soft landscaping treatment should generally express the historical spatial relationships and movement patterns of brick making operations about the site.

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Figure 68: Yarralumla Brickworks, Yarralumla: Location



Date 18 FEBRUARY 2003

AGREEMENT

BETWEEN

**AUSTRALIAN CAPITAL
TERRITORY**

("Licensor")

AND

**Thor Diesendorf trading as
Thor's Hammer**

("Licensee")

Licence

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THIS Licence is made on EIGHTEENTH day of FEBRUARY 2003

BY:

AUSTRALIAN CAPITAL TERRITORY, a body politic established under section 7 of the *Australian Capital Territory (Self-Government) Act 1988* (Cth) represented for the purposes of this agreement by Property an administrative unit of the Department of Urban Services.

AND:

MR THOR DIESENDORF trading as "Thor's Hammer".

1. DEFINITIONS AND INTERPRETATION

1.1 In the Licence unless the context otherwise requires:

"Accounting Period" has the same meaning as used in the Leases Act;

"Acts" means all present and future legislation and all amendments, re-enactments, regulations, by-laws and orders made in relation to such legislation;

"Authority" includes any government, local government or statutory body;

"Building" means the whole of the building interior and exterior including the roof and any other structures (whether permanent, temporary, movable or immovable) and any addition thereto together with all fixtures, fitting furnishings plant machinery and equipment (if any) owned by the Licensor and installed thereon and any addition thereto on the Land,

"Commencement Date" means the date of commencement of the Term created by the Licence being the date specified at Item 6 of Schedule 1;

"Disclosure Statement" means a disclosure statement under section 30 of the Leases Act;

"Land" means the land described at Item 3 of Schedule 1;

"Licence" means this Licence;

"Leases Act" means the *Leases (Commercial and Retail) Act 2001* (ACT);

- (3) The covenants on the part of the Licensor will bind the registered proprietor for the time being of the Land on which or of part of which the Premises form part;
- (4) All Schedules annexed to the Licence form part of the Licence;
- (5) Marginal notes and headings do not form part of the Licence;
- (6) Where a reference is made to any body or authority such reference will if the body or authority has ceased to exist be deemed a reference to the body or authority as then serves substantially the same objects as the body or authority and any reference to the President of such body or authority will in the absence of a President be read as a reference to the Chief Executive Officer for the time being of the body or authority.

2. TERM OF LICENCE

2.1 Term of Licence

From the Commencement Date, the Licensor grants a Licence over the Premises to the Licensee for the Term, at the Licence Fee and on the other terms set out in the Licence.

2.2 Further Term

The Term may be extended by the Further Term specified at Item 5(b) of Schedule 1 until the ultimate termination date specified at Item 5(c) of Schedule 1, on terms and conditions to be agreed between the Licensor and Licensee, PROVIDED THAT the Licensee is not in breach of this Agreement and the Licensee provides evidence of its compliance with relevant BCA fire regulations in respect of the Premises.

2.3 Holding Over

If the Licensee continues to occupy the Premises beyond the expiration of the Term of the Licence or any extension or renewal of it with the consent of the Licensor, it will do so on and subject to the covenants, conditions and terms of the Licence inclusive of all payments due by the Licensee to the Licensor under the Licence as a 'quarterly' Licensee only at a 3 monthly Licence Fee equal to one-quarter of the Licence Fee plus Outgoings, and Service Charges payable by the Licensee as provided under the Licence. Such tenancy may be determinable at the will of either the Licensor or Licensee by 3 month's notice in writing expiring on any day of the month.

2.4 Proposed Renewal

If this Licence does not contain an option to renew the term, not more than 12 months and not less than 6 months before the expiry date of this Licence, the Licensee, by written notice, may ask the Licensor if the Licensor intends to renew the Licence.

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5. OUTGOINGS

5.1 Outgoings separately metered or chargeable

The Licensee must promptly pay to the relevant Authority or provider of services to the Premises, all Outgoings and Service Charges that are payable by or chargeable directly to the Licensee.

5.2 The Licensee must promptly pay to the relevant Authority or provider of services, on behalf of the Licensor, all Outgoings and Service Charges payable by the Licensor which are separately provided or metered or relate solely to the Premises.

5.3 The Licensor must promptly provide to the Licensee a copy of any notice in respect of the Outgoings and Service Charges received from any Authority or other service provider.

5.4 If the Licensee defaults in payment of any Outgoings and Service Charges in clause 5, the Licensor may pay the same and, in addition to the Licensor's remedies in this Licence, may recover the amount so paid as if the same was Licence Fee in arrears.

5.5 Outgoings not separately metered or chargeable

If Item 9 of Schedule 1 provides for the payment of Recoverable Outgoings by the Licensee, the Licensor will:

- (1) during the Term of the Licence, give the Licensee a written estimate of the Recoverable Outgoings the Licensee is required to contribute to under the Licence, using the same item descriptions used in the Disclosure Statement, at least 1 month before the start of each Accounting Period; and
- (2) make a written expenditure statement available for examination by the Licensee within 1 month after the end of the Accounting Period to which it relates, which itemises the Recoverable Outgoings using the same item descriptions used in the Disclosure Statement.

5.6 The Licensor must give the Licensee a written report that complies with section 66 of the Leases Act and details all expenditure by the Licensor in each Accounting Period of the Licensor during the term of the Licence on account of Recoverable Outgoings to which the Licensee contributes.

5.7 Within 3 months after the end of each period for which the Licensee contributes to Recoverable Outgoings under the Licence, there must be the following adjustment between the Licensor and Licensee:

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7. MAINTENANCE AND REPAIRS

- 7.1 The Licensee will maintain the Premises in good structural repair and will attend to maintenance of a structural nature so that the Premises comply with the Minimum Building Standards specified at Schedule 3.
- 7.2 The Licensee, at its own expense, will keep the Premises, the perimeter fence delineated in the yellow colour on the plan annexed and marked with the letter "P" ("Perimeter Fence"), and the Licensor's Fixtures and Fittings, in good working order and repair to the reasonable satisfaction of the Licensor, fair wear and tear and damage by fire, storm, tempest, lightning, flood or earthquake excepted.
- 7.3 The Licensee will be responsible for all repairs and maintenance in respect of the Premises and the access road from Dudley Street, Yarralumla to the Premises.
- 7.4 The Licensee will comply with any notice in writing by the Licensor requiring the Licensee to repair or clean in accordance with the provisions of this Licence.
- 7.5 The Licensee will repair and/or clean the Premises according to the notice referred to in clause 7.4. If the repairs are not carried out in accordance with the terms of such notice, the repairs and cleaning may be carried out by the Licensor and recoverable from the Licensee as if such repairs were arrears in Licence Fee.

8. ASSIGNMENT AND SUB-LETTING

- 8.1 The Licensee will not assign, sublet, or part with possession of the Premises or any part of the Premises or mortgage the Licensee's interest under this Licence without the Licensor's prior written consent.

9. INDEMNITY AND INSURANCE

- 9.1 The Licensee will indemnify and keep indemnified the Licensor, its employees, subcontractors, agents, invitees or licensees ("those indemnified") from and against all claims, demands, actions, suits and proceeding arising out of any accident to or injury suffered by those indemnified whilst those indemnified are in or on the Premises except to the extent that any such claim, demand, action, suit, proceeding, injury or damage was caused by the negligent act, omission or default of the Licensor.
- 9.2 At its own expense, the Licensee must take out in the joint names of the Licensor and the Licensee with a reputable insurer (and will on request of the Licensor supply the Licensor with evidence of currency) the following insurance a public risk policy that provides for a minimum cover for each person, accident, claim or incident of the amount specified at Item 10 of Schedule 1 or any reasonable higher amount that the Licensor notifies.

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(2) either:

- (a) the Premises have to be or have been demolished because of the damage; or
- (b) the damage extends to more than 50% of the Premises.

12.2 No compensation is payable by the Licensor to the Licensee as a result of the Licensor's termination under this clause 12.

12.3 On giving 14 days prior written notice to the Licensor, the Licensee may terminate this Licence if the Premises are damaged in a material way.

12.4 No compensation is payable by the Licensee to the Licensor as a result of the Licensee's termination under this clause 12.

13. RESOLUTION OF DISPUTES

13.1 If a difference or dispute ("Dispute") arises in relation to this Licence then either party may give written notice to the other that a Dispute exists and giving details of the Dispute. The parties agree that, following the issue of such a notice, they will endeavour to resolve the Dispute by negotiations, including by referring the Dispute to persons who have authority to intervene and direct some form of resolution.

13.2 If the Dispute has not been resolved under clause 13 within 28 days of the notice of the Dispute, then the parties agree that they will undertake a mediation process. The mediator will be an independent mediator agreed by the parties or, failing agreement, nominated by the chairperson of the Institute of Arbitrators and Mediators Australia, (ACT Division). Unless otherwise agreed, the parties will share the costs of the engagement of the mediator.

13.3 Nothing in this clause will prejudice the rights of either party to make an application to the Australian Capital Territory Magistrates Court or any other rights to institute proceedings in relation to this Licence or to seek injunctive or urgent declaratory relief in respect of any Dispute.

14. TERMINATION OF LICENCE

14.1 This Licence may be terminated by either party giving the other party 6 months notice in writing, or such earlier termination as agreed by the parties in writing.

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15. APPLICATION OF THE LEASES ACT

In the event of any inconsistency between the terms and conditions of this Licence and the Leases Act, the Leases Act prevails.

16. GENERAL PROVISIONS

- 16.1** The Licence will be governed by and construed in accordance with the laws for the time being in force in the Australian Capital Territory and the parties submit to the jurisdiction of the courts of the Australian Capital Territory.
- 16.2** Any covenant or provision in the Licence which is not applicable to the Premises or which is repugnant to the general interpretation of the Licence or which is invalid, unlawful, void or unenforceable will be capable of severance without affecting any other of the obligations of the parties pursuant to the Licence.
- 16.3** Any notice, or other communication required or otherwise to be given or sent to the Licensor or the Licensee under this Licence will be in writing and forwarded to the addresses or facsimile numbers specified at Item 11 of Schedule 1 or such other address or facsimile number as may be notified by a party to the other from time to time, and will be deemed to be duly given or sent if:
- (1) sent by prepaid mail to the address of the recipient; or
 - (2) sent by facsimile to the recipient.
- 16.4** A notice or other communication will be deemed to have been given or received if:
- (1) sent by prepaid mail upon the expiration of 3 days after the date on which it was so sent;
 - (2) sent by facsimile, upon the sender's facsimile machine recording that facsimile has been properly transmitted to the recipient's address; and
 - (3) delivered personally, upon the day of delivery.

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SCHEDULE 2

RULES AND REGULATIONS TO BE FOLLOWED BY THE LICENSEE IN THE LICENCE

1. **Garbage**

The Licensee must keep the Premises clean and tidy and procure the regular and prompt removal of all rubbish, garbage, waste, including sawdust and litter from the Land or Premises.

2. **Accident or Defect**

The Licensee must give to the Licensor prompt notice in writing of any damage to or defect in any of the services connected to the Premises.

3. **Signs**

The Licensee must not paint, affix or exhibit or permit to be painted, affixed or exhibited onto or upon or in any part of the Premises any sign notice name place placard post or other advertisement except with the prior written approval of the Licensor which approval will not be unreasonably withheld.

4. **Keys and Cards**

All keys and badge access cards to the Premises provided by the Licensor to the Licensee for use during its occupancy must be immediately surrendered to the Licensor on the termination of the Licence. The Licensee must not make any duplicate or facsimile of such keys or cards and any duplicate or facsimile required by the Licensee will be supplied by the Licensor at the cost of the Licensee.

5. **Inflammable and Dangerous Materials**

The Licensee must not bring onto or store in or on the Premises, any chemical, inflammable liquid, acetylene gas or alcohol, explosive chemical, oil, compound or substance except as may be reasonably necessary for customary office applications.

6. **Animals**

No animals or birds will be kept in or about the Premises.

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SCHEDULE 2 (Continued)

11. Provision of fire fighting Equipment.

The Licensee must provide and maintain fire equipment on the Premises in accordance with all relevant regulation.

13. Licensor's Insurance

The Licensee must not permit or suffer anything to be done on the Premises or bring or keep anything in the Premises which may in any way invalidate or breach the conditions of any insurance policies effected by the Licensor or cause to increase the premium payable by the Licensor and the Licensee will reimburse the Licensor for such increased premiums as may result from the Licensee's failure to comply with the provisions of this Item 13.

14. No Alterations of Additions

The Licensee must not make any alterations or additions, whether structural or otherwise, to any part of the Premises, or do any building work or redesign the interior of the Premises without the prior written consent of the Licensor.

15. Noisome or offensive activity

The Licensee must not carry on, or permit to be carried on, or done in or upon the Premises, or any part of the Premises, any noxious, noisome or offensive activity or anything which is of an illegal nature or which constitutes a nuisance, annoyance or damage to the Licensor or any other Licensees within the Premises which constitutes an infringement of any legislation or affecting the Premises or business for the time being carried on in the Premises, and the Licensee will at all times comply with the requirements of such legislation.

16. Use of Kilns

The Licensee must not use the Kilns or other areas identified in blue on the plan annexed and marked with the letter "P", for any purpose whatsoever during the Term of this Agreement or any extension or renewal of it.

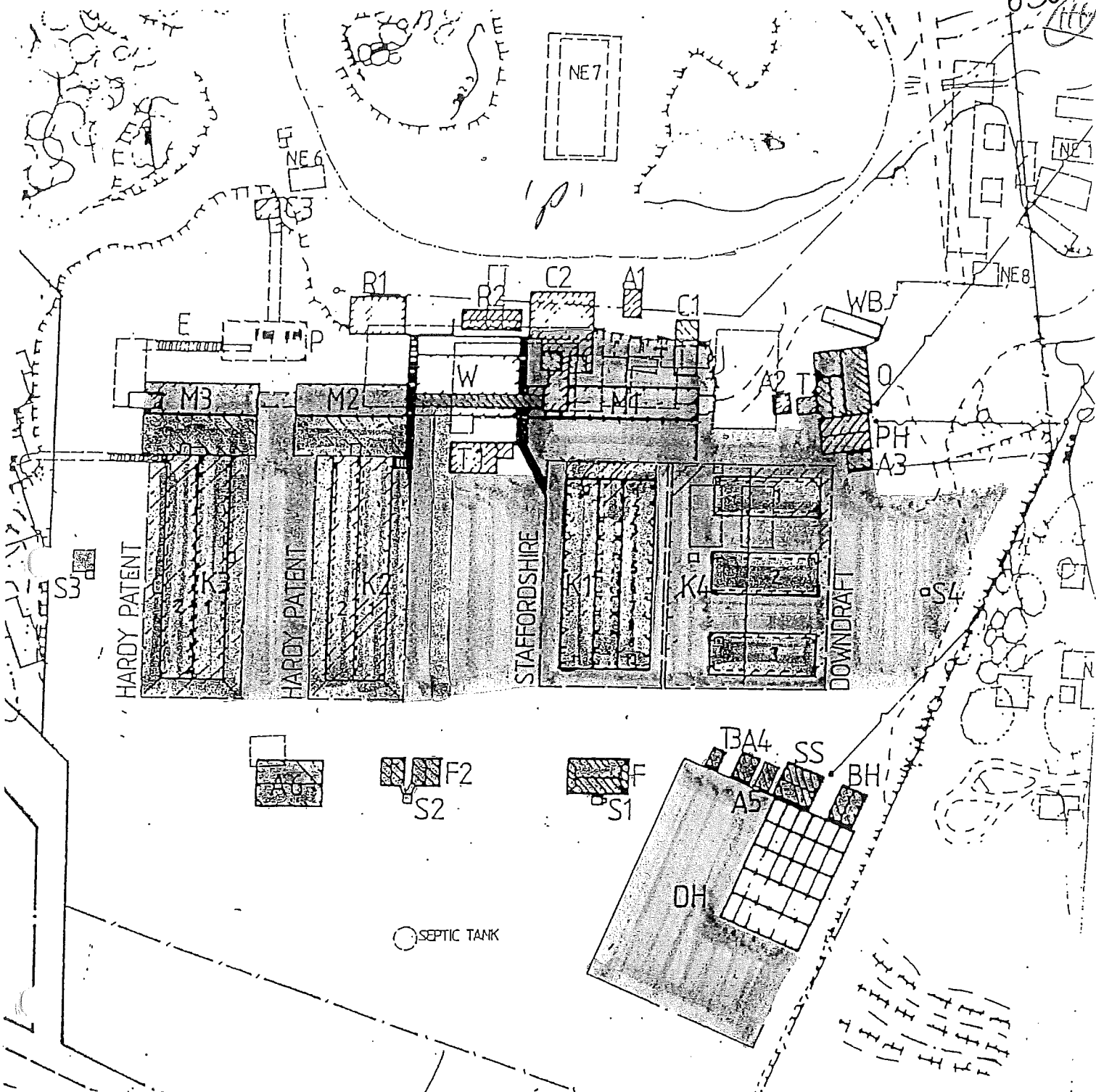
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ATTACHMENT A
 DISTRIBUTION OF LICENSOR AND LICENSEE RESPONSIBILITIES IN RELATION
 TO OUTGOINGS AND SERVICE CHARGES

Details of Recoverable Outgoings	Percentage of Licensee responsibility (A)	Percentage of Licensor responsibility (B)
CLEANING		
Cleaning - general (see clause 4.2)	100%	Nil
Cleaning - Toilet requisites	100%	Nil
Rubbish removal/tradewaste bins	100%	Nil
ENERGY (Electricity & Gas)		
Electrical & Gas to operate plant	100%	Nil
Electrical & Gas to operate plant and energy consumption after hours	100%	Nil
Electrical consumption Such as lighting, power, data points (not plant operating)	100%	Nil
FIRE PROTECTION		
Fire Extinguishers.	100%	Nil
GARDENING		
Mowing / Maintenance	100%	Nil
FIRE PROTECTION		
Fire Extinguishers.	100%	Nil
INSURANCE		
Insurance - Public Liability	100%	Nil
REPAIRS & MAINTENANCE		

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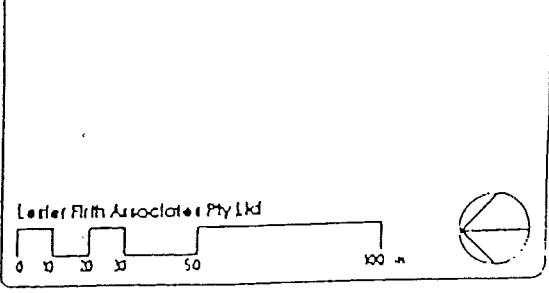
DETAIL OF KILN AREA

KEY

- | | |
|--|---|
| <ul style="list-style-type: none"> 1 Kiln - Staffordshire c 1915 2 Kiln - Hardy Patent c 1927 3 Kiln - Hardy Patent c 1953 4 Kiln - Downdraft c 1961 1 Fan House for Staffordshire c 1915 2 Fan House for Patent c 1927 1 Chimney Stack for Staffordshire c 1915 2 Chimney Stack for Patent c 1927 3 Chimney Stack for Patent c 1953 4 Chimney Stack for Downdraft c 1961 1 Machine Bay for Staffordshire and Downdraft c 1955 (also Brick Press Building 1) 2 Machine Bay Patent c 1955 3 Machine Bay Patent c 1955 Workshop c 1955 1 Small Crusher House (Mazong) 2 Large Crusher House (or Pan Building) c 1955 1 Primary Crusher House c 1955 1 Pan Building Site c 1955 1 Elevator Conveyor c 1955 1 Office c 1916 1 Power House c 1915 1 Workshop c 1960's 1 Toilet Block (lockers, lunch & first aid) c 1947/50 1 Minor toilet block | <ul style="list-style-type: none"> T3 Minor toilet block B1 Boiler House c 1971 SS Sub Station and Control Room c 1971 DH Drying House and Slab c 1971 R1 Railway (model) Workshop c 1979 R2 Railway (model) Storage Shed c 1979 Q Quarry Beckpile A Geological Monument B Geological Monument C Geological Monument D Geological Monument A1 Ancillary Building Storage Shed c 1958 A2 Ancillary Building Studio/Shed A3 Ancillary Building Studio/Shed Former Burners Hut A4 Ancillary Building Studio/Shed A5 Ancillary Building Studio/Shed A6 Rockpile Shed c 1965 NE1 Site of 1911 Temporary Open kilns and workshop NE2 Site of Brickworks Camp (Accumulation village) NE3 Site of Explosives Store NE4 Site of Weatherment Storage NE5 Site of oil tank/coal store NE6 Site of Cobbing and associated buildings NE7 Site of Clay Storage Area (shed) NE8 Site of Carpenters Shed |
|--|---|

Chamberlain Brickworks

ELEMENT LOCATION PLAN



Leslie Firth Associates Pty Ltd

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Fact Sheet

Department of Urban Services

Yarralumla Brickworks

- Yarralumla Block 1 Section 102 is located on Deman Drive and known as Yarralumla Brickworks. The Brickworks comprises a number of buildings and an original quarry or 'brick pits' and is located on approximately 9.6 Ha of land.
- Property Branch manages the Brickworks. The area adjacent to the Brickworks, whilst Parks and Places has always maintained it, has only recently been formally transferred to Parks and Places by ACTPLA.
- The Brickworks is used by one major tenant, Thor's Hammer, plus a number of artist groups. Otherwise, it is fenced off from public access.
- A representation was made by [REDACTED] ACT Strata Management on 23 September 2002 on behalf of Body Corporate of [REDACTED] Yarralumla, complaining that the area around their complex had overgrown blackberries as well as grass and shrubs which could pose a fire hazard and were an eyesore. The Minister for Urban Services wrote back advising that appropriate action was being taken to attend to his concerns.
- By November 2002 grass slashing was complete and a bulldozer had been utilized to remove blackberry bushes in and outside the Brickworks. Regrowth was sprayed in mid March 2003.
- Following the bushfires of January 2003, residents of Bentham Street, Yarralumla raised concerns about pine trees along the boundaries of the Brickworks and area adjacent to their properties. Residents were advised that the ACT Fire Brigade inspected the site on 18 March 2003 and advised that the trees in question did not pose any fire hazard.
- [REDACTED] made a further representation on 17 August 2003, again on behalf of the Body Corporate of [REDACTED] complaining that the poisoned blackberries on adjacent unleased land near the entrance to the Brickworks posed a fire hazard. This ministerial was referred to ACTPLA for response as it was the custodian of the land in question at that time.
- A representation was made by [REDACTED] on 8 October 2003 on behalf of the Body Corporate of [REDACTED] Yarralumla, complaining that the timber stored on the Brickworks site could pose a fire hazard. The response to Mr Bowditch advised of an inspection conducted by ACT Fire Brigade that deemed the area not to be a fire hazard and that the ACT Fire Brigade would continue to monitor the situation during the summer months. In addition Property Branch was arranging grass slashing and a fuel reduction program during November 2003.
- A further representation from [REDACTED] on 21 January 2004 on behalf of [REDACTED] Body Corporate raised concerns that the surrounding undergrowth, blackberries and trees were creating a fire hazard. [REDACTED] was advised of fire hazard reduction measures completed in December 2003, which included felling of trees and removal of woody weeds along [REDACTED] boundary with the Brickworks. He was again advised that the ACT Fire Brigade was continuing to monitor the site during the summer months.

Fact Sheet

Department of Urban Services

Yarralumla Brickworks

- Property Branch had undertaken significant tree reduction along the residential boundaries of Woolis, Schomburgk, and Bentham Streets and Lane Poole Place. It had established a 15 metre urban space buffer from the residential boundaries. The cost of the project was [REDACTED]. The program had occurred after all adjacent residents were consulted about the program. While most supported the work being done, there were some residents that wanted trees along boundaries near their homes to be left alone.
- [REDACTED] made a further representation on 19 October 2004 on behalf of the [REDACTED]. He complained that in the area adjoining the Brickworks there were dead trees, shrubs, blackberry bushes posing a fire hazard and eyesore. He was advised that although the area in question was outside the Brickworks and was therefore the responsibility of ACTPLA, Property would contact relevant ACTPLA officers to ensure the area was cleaned up.
- Until this financial year ACTPLA retained the custodianship of vast areas of urban unleased land in Canberra including some land adjacent to the Brickworks. It transferred custodianship of this land to Parks and Places at the start of the financial year.
- Parks and Places received a representation from [REDACTED] on 17 November 2005. It was written on behalf of the Body Corporate of [REDACTED] and complained that due to recent rains, the grass and shrubs in the Brickworks had grown extensively. Parks and Places responded in January 2006 by advising of the maintenance program in place for the site and provided dates of mowing undertaken on the site over the latter part of 2005, including the most recent on 9 December.
- As a result of the fires that occurred on 29 December 2005, Urban Services is developing an integrated facilities management plan for the Brickworks and adjacent unleased land. This includes working with the Fire Brigade to ensure immediate access and accessibility within the site, and levelling some areas to enable easier maintenance. In addition, further tree management is planned, including removing dead trees and clearing all live tree trunks to a height of two metres to further mitigate the ongoing risk of fire. Urban Services has also achieved a significant reduction in fire risk in relation to the operations of the Brickwork's major tenant, Thor's Hammer.

Stephen Ryan, Director Property

Phone: 6205 2250

Updated: 15 February 2006



sellick consultants

26 June 2007

Department of Territory & Municipal Services
 Facility Management Section Property Group
 PO Box 777
 Fyshwick ACT 2609

Attention: Mr Peter Ozols

Dear Peter

OLD CANBERRA BRICKWORKS, YARRALUMLA, ACT

I refer to our site meeting, inspection of the above premises carried out on 25 June 2007 and to your request to provide a structural report on the condition of a two storey partly demolished building at the south west.

The building was inspected by Mr Jan Ruckschloss, MIEA, NPER (Sellick Consultants) and Mr Peter Ozols (Department of Territory and Municipal Services).

The report is based purely on visual observations. No design documentation for the building was available at the time of the inspection.

The two storey building consists of concrete slab on ground, brick piers with partly demolished dividing buttress walls supporting reinforced concrete suspended deck slab with steel beams.

Observations

Observations arising from the inspection are as follows (also refer to the attached photographic documentation):

- The majority of the dividing internal double brick walls was demolished. This has affected the structural integrity of the remaining brick piers carrying the loads from the upper concrete deck as well as the overall stability of the building. The internal walls had acted as buttress walls providing stiffness for the building.
- Most of the brick piers do not appear to be vertical, are weathered and cracked.
- The structural integrity of the brick piers particularly at the western side has been affected by the demolition of the upper deck. The piers are cracked providing minimum bearing for the steel upper deck beams.
- The main steel beams have been exposed to weather for a long time and have been found heavily corroded.

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sellick consultants

- The demolished upper deck at the west has been left leaning onto the building. The mass of the deck imposes lateral forces to the building that is weak in east-west direction.
- The roof metal sheeting has been used to cover the voids in the upper deck tied with bricks.

Recommended Action


In view of the above described observations it appears obvious that the building is structurally unsafe and it should be fenced off immediately to prevent any access to either public or employees working in the complex.

Currently the ground level is used for storage of recycled timber that is transported with forklifts. Even small lateral impact from the forklift can trigger a progressive collapse of the upper concrete deck. The metal sheets covering the voids may also get airborne and cause serious injuries.

The building appears to be beyond a stage of reasonable structural repairs and in our view it should be demolished.

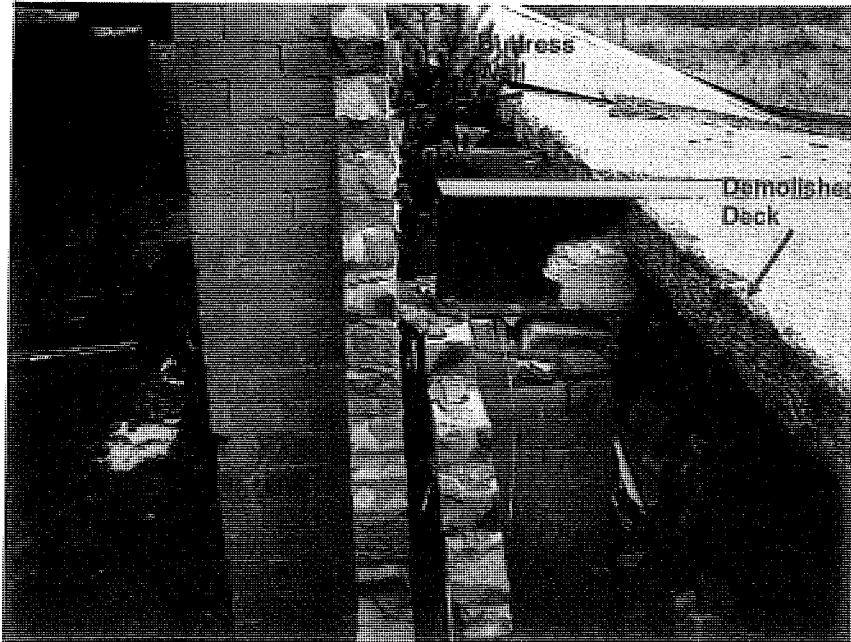
Should you have any queries regarding the above matter please do not hesitate to contact the undersigned.

Yours faithfully
SELICK CONSULTANTS PTY LTD

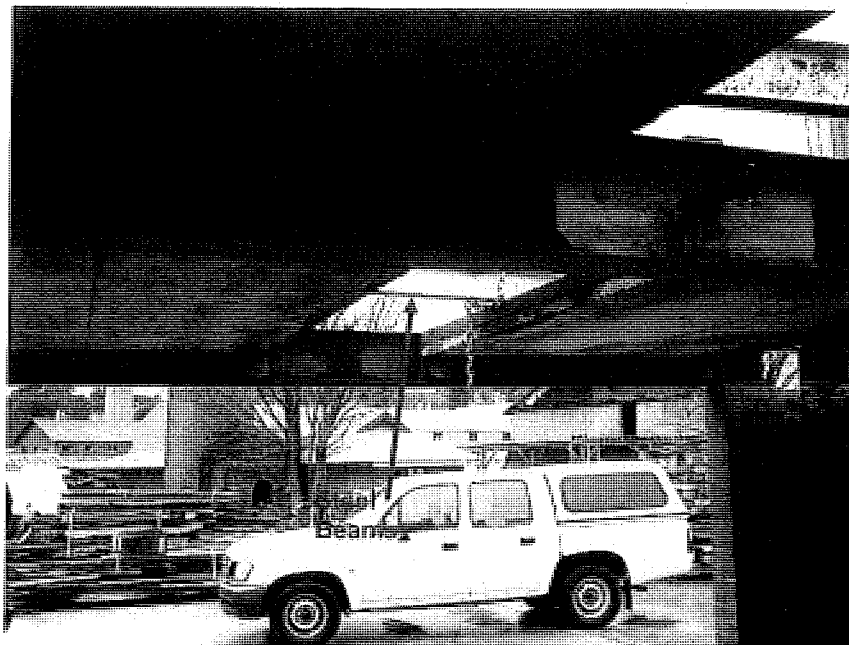

Jan Ruckschloss
(Director)



Sellick Consultants Pty Ltd

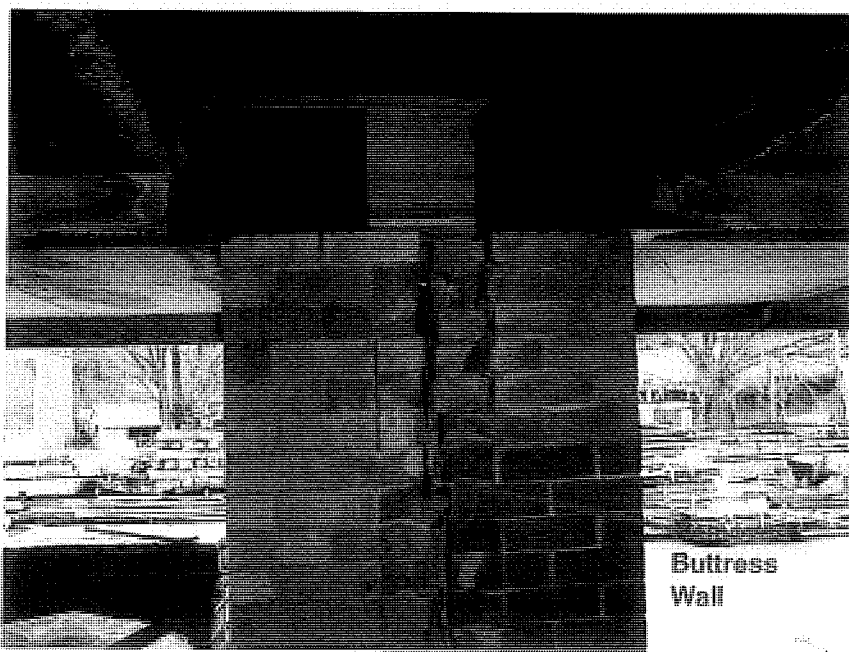


View on demolished deck



View from Inside

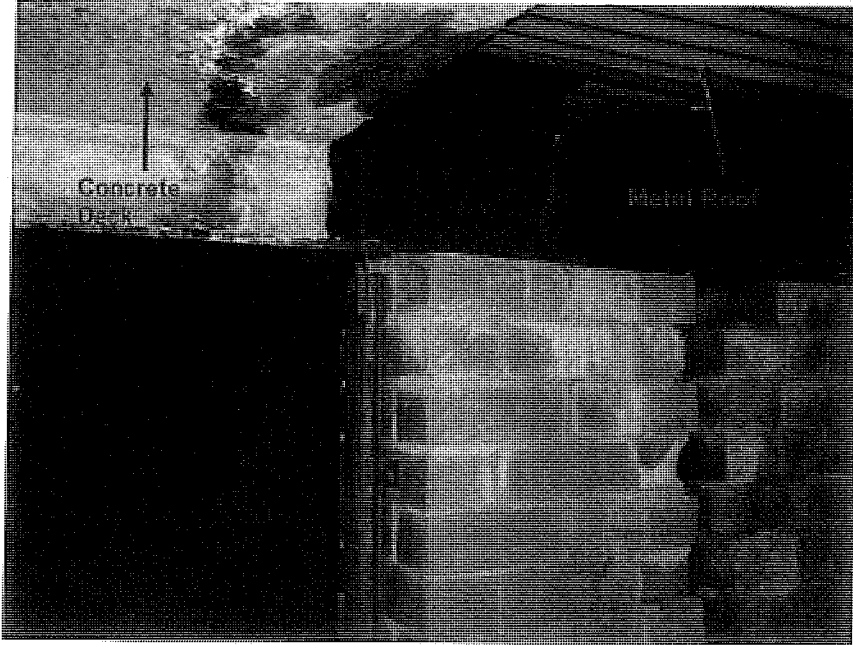
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View on Internal Pier



View on External Pier



Detail at Beam / Pier Support



Overall View



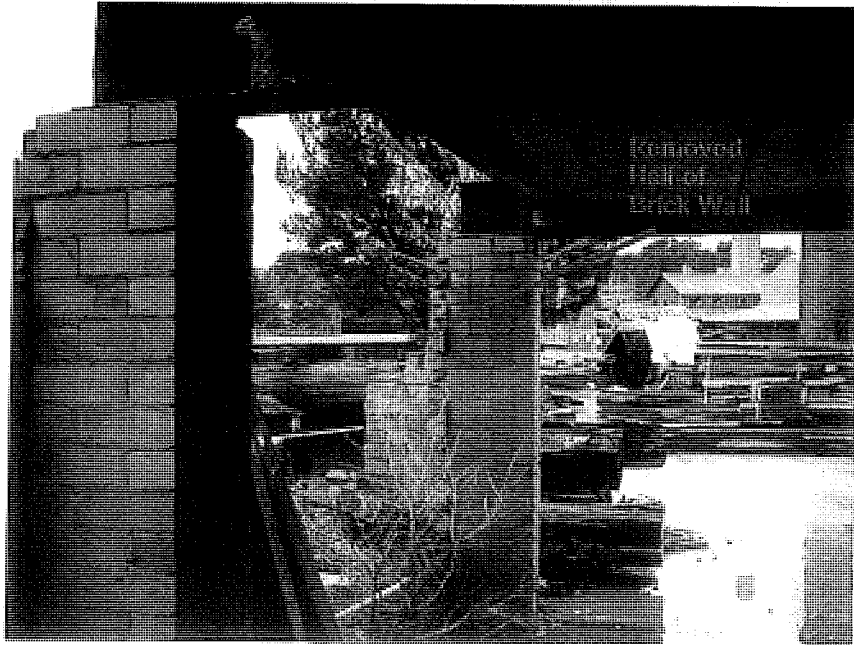
Overall View



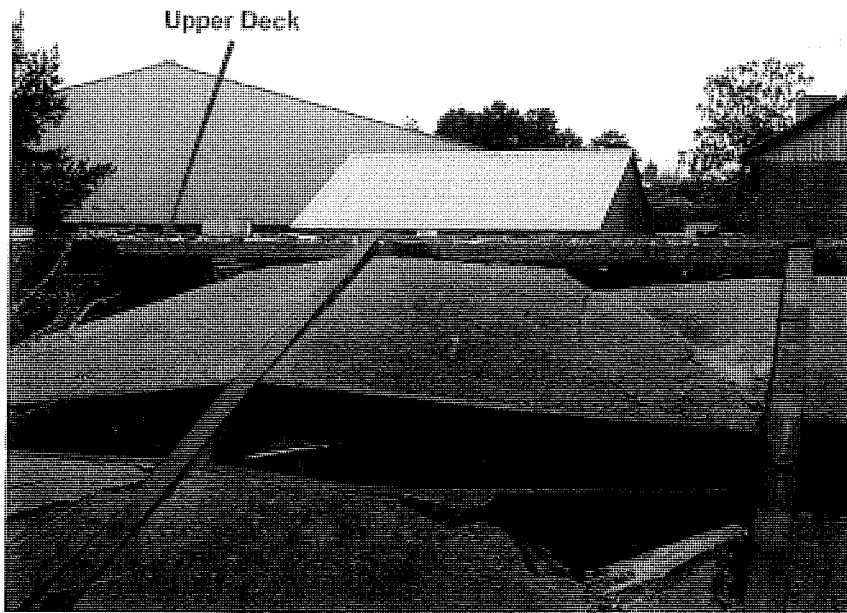
View on Brick Pier



Sellick Consultants Pty Ltd



View of External Piers



Demolished Deck

Asset Condition Report CANBERRA BRICK WORKS 26 July 1998

Rehabilitation of the Site	Date of work	Assessment/Comments
Kiln - Staffordshire K1 - Galvanised Iron - Brickwork - Roof Trusses - Doors		Satisfactory. Loose bricks, cracks in mortar. Verandahs - north side small section has been restored. remaining verhadahs decayed flooring, partly collapsed and rusty. Decayed louvres, broken vandalised windows. Iron sheeting on West side rusty.
Kiln - Hardy-Patent K2		Satisfactory Window glass broken and vadalised.
Kiln - Hardy-Patent K3		Satisfactory. Surface rust on corrugated iron roof. Eave on North West and West wall has been removed offering no protection to kiln wall. All window glass broken vandalised. Roof littered with broken pieces of bricks - vadals.
Kilns - Downdraft K4		
	KILN 1	Loose bricks over top of Southern doorway arch. Cracks in side walls
	KILN 2	Loose bricks over top of Southern doorway arch. Loose bricks and minor cracks to side walls.
	KILN 3	Loose bricks over top of Southern doorway arch. Loose bricks and minor cracks to side walls.
Corrugated Iron Roof		Good Condition - The above 3 Kilns are enclosed by a steel framed, corrugated iron roof structure. The walls are clad half way down the overall height of the structure.

Carrelaker
 - Bruce McDonald -

GRANT DETERMINATION FOR 1998/99 ACT HERITAGE GRANTS PROGRAM - DIRECTED GRANTS

Column 1 APPLICANT	Column 2 AMOUNT	Column 3 PROJECT
ACT Heritage Festival Committee	\$20,000.00	Heritage Festival 1999

.....
MINISTER'S SIGNATURE

...../06/1998

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Asset Condition Report CANBERRA BRICK WORKS 26 July 1998

Rehabilitation of the Site	Date of work	Assessment/Comments
Fan House for Hardy-Patent Kiln F1		Unsatisfactory. No doors, frames only. All windows are broken, vadalised. Wooden celing lining missing boards poor condition. Corrugated iron cladding on walls and roof missing. Basement floors covered in mud and water possible rising damp. Eaves rotting. Window glass broken - vadalised. Unsatisfactory.
Fan House for Staffordshire Kiln F2		Corrugated iron wall and roof sheeting rusted or missing.
Office O - external - Electricity - Plumbing - Telephone		Unsatisfactory. Eaves are missing and rotting, need re-painting. Guttering rusted needs replacing.
Office O - - Electricity - Plumbing - Telephone		Good condition.
Power House PH - External		Unsatisfactory. Eaves are missing and rotting, need re-painting. Guttering rusted needs replacing
Quarry Q		Good condition

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1998/99 HERITAGE GRANTS PROGRAM

NON-DIRECTED GRANTS

RECIPIENT	AMOUNT	PROJECT
All Saints Anglican Church, Ainslie		Urgent conservation work on All Saints Anglican Church, Ainslie
Anglican Diocese of Canberra & Goulburn		To prepare Anglican Diocese of Canberra and Goulburn Diamond Jubilee history
Australian Academy of Science		Oral histories relating to Becker House (the Dome) and the early history of Academy
Bands Music Action		<i>Heard and Scene in Canberra</i> - an article on the 1950s music scene in Canberra
Canberra & District Historical Society Inc		To provide community access to Society's heritage resources
Canberra & District Historical Society Inc		To publish <i>Canberra Historical Journal</i> twice yearly
Canberra & District Historical Society Inc		To produce a computer catalogue of artworks in CDHS collection
Canberra & District Historical Society Inc		To provide professional development of Blundells' Cottage staff
Canberra Archaeological Society		To undertake an archaeological survey of Murrumbidgee district, targeting lands recently acquired by Murrumbidgee River Corridor (MRC)
Fire Brigade Historical Society		To complete restoration on a vintage fire engine
Greg Moore		To complete and publish <i>Cotter Country</i> - a history of early settlers and events in County of Cowley started by late Bruce Moore
Gungahlin Regional Community Service		To produce 2 Gungahlin Heritage Drive brochures

Asset Condition Report CANBERRA BRICK WORKS 26 July 1998

Rehabilitation of the Site	Date of work	Assessment/Comments
Geological Feature A		Good condition
Geological Feature B		Good condition
Geological Feature C		Good condition
Geological Feature D		Good condition
Chimney Stacks S1		Good Condition. Blackberry bushes growing at base of chimney
Chimney Stacks S2		Good Condition
Chimney Stacks S3	1997 1997	Good Condition Lightning conductor installed Crack in bricks at top left corner of stack assessed as safe. Weeds growing at base of chimney.
Chimney Stacks S4		Good Condition

1998/99 HERITAGE GRANTS PROGRAM

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NON-DIRECTED GRANTS

RECIPIENT	AMOUNT	PROJECT
Heraldry & Genealogy Society of Canberra Inc		To promote heritage education through family history, including the microfiching of Indexes to Anglican Registers of Canberra-Goulburn Diocese
Institution of Engineers, Australia: ACT		Oral history - Kingston Powerhouse engineering research and interpretation
Matthew Higgins		To continue 1996 fieldwork - ACT-NSW Border Phase 2
National Trust of Australia (ACT)		Oral history - <i>The People of Canberra During World War II</i>
National Trust of Australia (ACT)		To redesign <i>Federal Capital Architecture</i> for a revised edition
National Trust of Australia (ACT)		To provide community education and heritage awareness activities
National Trust of Australia (ACT)		To prepare 18 heritage nominations and citations to ACT Interim Places Register as determined by ACT Heritage Unit
North Belconnen Uniting Church		To complete restoration of Leggo pipe organ (a 1920s organ), by installation of a new blower, and final tuning by organ builder.
Peter Freeman Pty Ltd		To prepare for publication a monograph already researched on Malcolm Moir and Heather Sutherland
Royal Australian Institute of Architects (ACT)		To produce 8-10 ACT citations for inclusion in register of significant twentieth century architecture (RSTCA)
St John's Schoolhouse Museum		Re-shingling of St John's Schoolhouse Museum roof
Tony Fearnside		ACT Aboreta - public interpretation of heritage values stage 2
Uniting Church in Australia		To produce Weetangerra Cemetery conservation plan
WaterskiACT		To gather the history of ACT waterskiing
TOTAL ALLOCATION FOR COMMUNITY GRANTS		

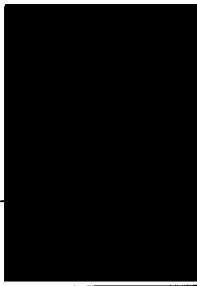
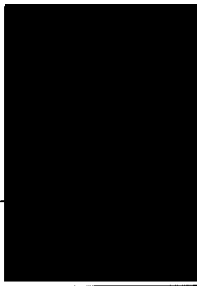
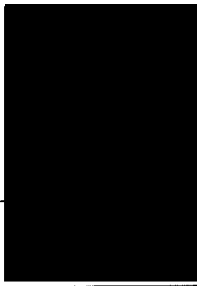
Asset Condition Report CANBERRA BRICK WORKS 26 July 1998

Rehabilitation of the Site	Date of work	Assessment/Comments
Machine Bay for Staffordshire and Downdraft Kilns M1		Satisfactory. Missing corrugated iron wall and roof cladding. Windows broken - vandalised.
Machine Bay for Hardy-Patent M2		Satisfactory. Missing corrugated iron cladding on walls and roof. Windows broken - vandalised.
Machine Bay for Hardy-Patent M3 Workshop		Satisfactory. Missing corrugated iron cladding on walls and roof. Windows broken/missing.
Workshop W		Satisfactory. Missing corrugated iron cladding on walls and roof. Windows broken/missing.

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1998/99 ACT HERITAGE GRANTS PROGRAM

DIRECTED GRANT PROJECTS

RECIPIENT	AMOUNT	PROJECT
Recipient to be identified		Heritage Festival 1999
Recipient to be identified		To assess historic sites in and around Hall village
TOTAL ALLOCATION FOR DIRECTED GRANTS		

Asset Condition Report CANBERRA BRICK WORKS 26 July 1998

Rehabilitation of the Site	Date of work	Assessment/Comments
Small Crusher House C1		Satisfactory. Missing corrugated iron cladding on walls and roof. Windows broken/missing.
Large Crusher House C2		Satisfactory. Missing corrugated iron cladding on walls and roof. Windows broken/missing.
Large Crusher House C3		Unsatisfactory. Semi-derelict state. Most of the corrugated iron cladding on walls and roof is missing.
Elevator Conveyor E		Timber decking in poor condition. Exposed timber wall and roof frame in poor condition. ?weeds ?rubbish Windows broken/missing.
Quarry		Unsatisfactory. Semi-derelict state. Missing corrugated iron cladding on walls and roof. Timber walkway in poor condition. Steel frame covered in rust. Good Condition.

GRANT DETERMINATION FOR 1998/99 ACT HERITAGE GRANTS PROGRAM - DIRECTED GRANT

Column 1 APPLICANT	Column 2 AMOUNT	Column 3 PROJECT
<i>Recipient to be identified</i> ACT Heritage Festival Committee	[REDACTED]	Heritage Festival 1999
71	[REDACTED]	To assess historic sites in and around Hill Village.

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MINISTER'S SIGNATURE

...../07/1998

Asset Condition Report CANBERRA BRICK WORKS 26 July 1998

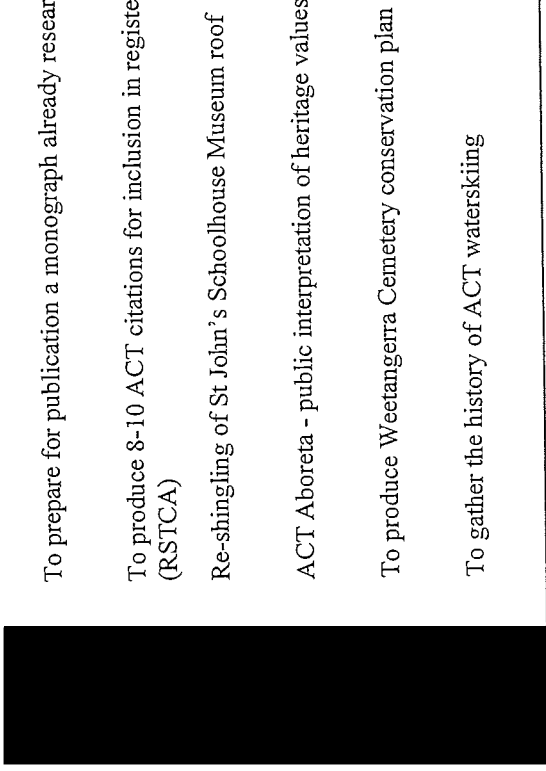
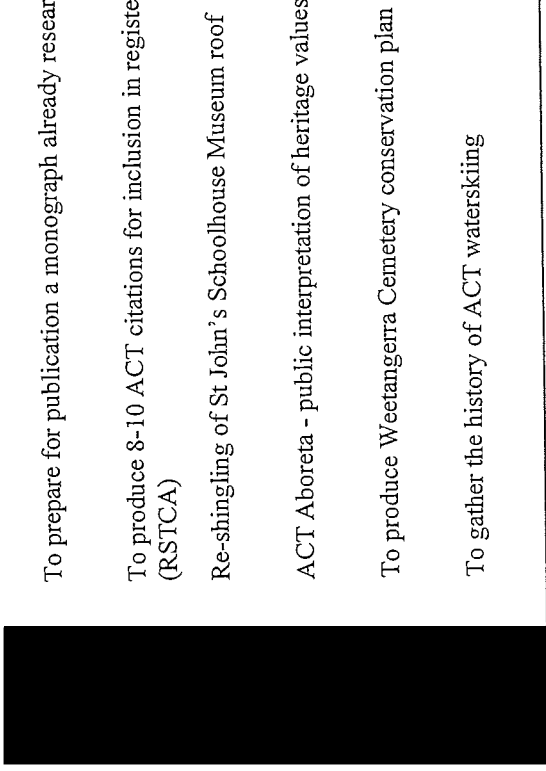
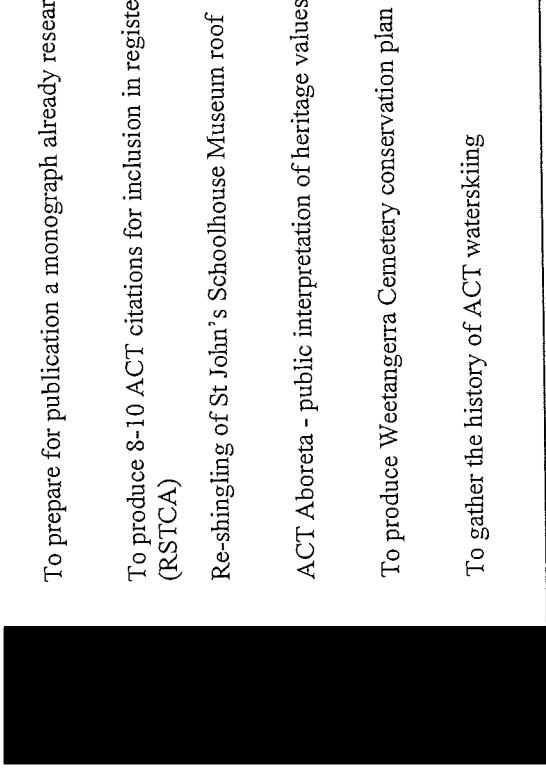
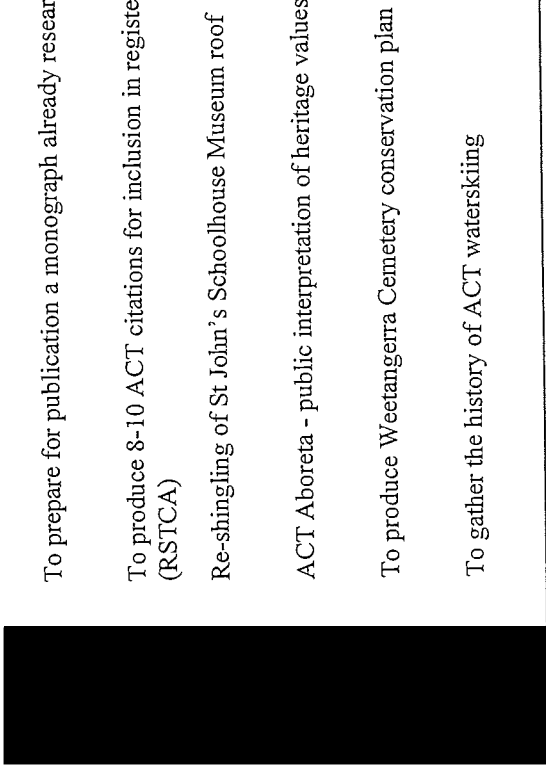
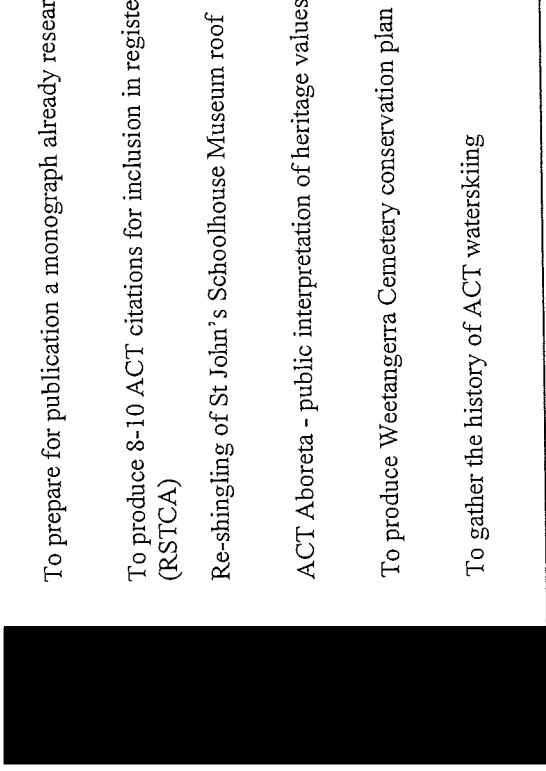
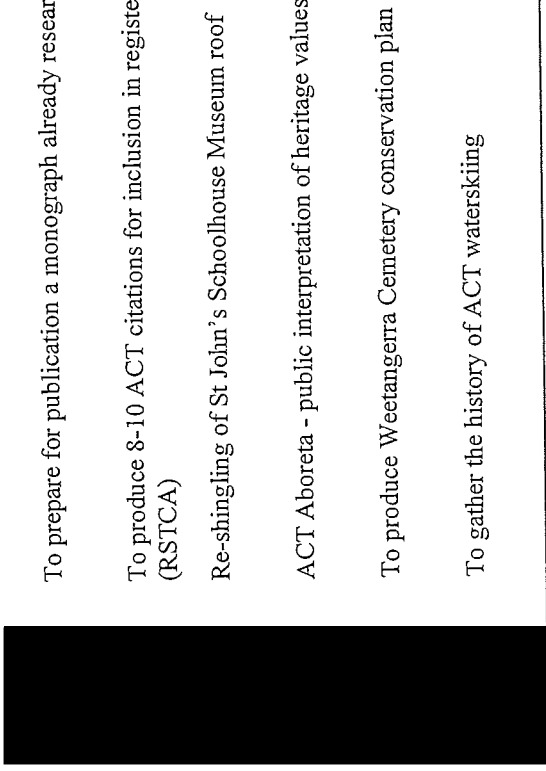
Rehabilitation of the Site	Date of work	Assessment/Comments
Open Spaces - vegetation		Satisfactory.
Open Spaces general		Large contained areas of balckberries. Weeds generally growing in between cracked concrete
Perimeter Fence		Some areas are tenanted and are being used for storage areas. eg. anntique and old wares, recycled timer etc. Satisfactory.
		South fence starting to fall due to erosion and weed infestation. Barbed wire is loosed in places.
Please note details of the work carried out in this report may be referenced in File No.		

ASSESSMENT COMMENTS

Assesment is rated as follows: ● Good Condition ● Satisfactory ● Unsatisfactory

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GRANT DETERMINATION FOR THE 1998/99 HERITAGE GRANTS PROGRAM - NON-DIRECTED GRANTS

Column 1 APPLICANT	Column 2 AMOUNT	Column 3 PROJECT
Peter Freeman Pty Ltd		To prepare for publication a monograph already researched on Malcolm Moir and Heather Sutherland
Royal Australian Institute of Architects (ACT)		To produce 8-10 ACT citations for inclusion in register of significant twentieth century architecture (RSTCA)
St. John's Schoolhouse Museum		Re-shingling of St John's Schoolhouse Museum roof
Tony Fearnside		ACT Aboreta - public interpretation of heritage values stage 2
Uniting Church in Australia		To produce Weetangerra Cemetery conservation plan
WaterskiACT		To gather the history of ACT waterskiing

.....
 MINISTER'S SIGNATURE
/07/1998

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